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Bibliography on Tropical Cyclone Theory, p. 1405

7 November 1956 No. 11

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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* Address all business communications, orders and inquiries to the Executive Secretary, Mr. Kenneth C. Spengler, 3 Joy Street, Boston 8, Mass. Exchanges and reprints may be sent direct to P. O. Box 1736, Washington 13, D. C.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

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SUBSCRIPTION RATE: $8.00 per year to members and non members. Single and back issues $2.00. Back volumes, $10 per volume.

This publication has been made possible through support and sponsorship extended by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command, under Contract No. A. F. 19 (604)-2062.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 7 NOVEMBER, 1956 No. 11

SPECIAL FEATURE IN THIS ISSUE

An Annotated Bibliography on Tropical Cyclone Theory

by
Wilhelm Nupen

Prepared for
U. S. Weather Bureau

(For complete table of contents see back cover)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

Digitized by the Internet Archive
in 2025

https://archive.org/details/meteorological-and-geoastrophysical-abstracts_1956-11_7_11

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references on a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
10. Weather Modification	11. Cooling Power	

Vol. VII, 1956

1. Synoptic Meteorology of the Arctic
2. Climate of Enclosed Spaces
3. Cosmic Rays in the Atmos. (–1952)
4. Cosmic Rays in the Atmos. (1953–1956)
5. Atmospheric Radioactivity
6. Tropospheric Inversions
7. Snow Micrometeorology
8. Snow Micrometeorology (Supplement)
9. Tropical Cyclones, Hurricanes and Typhoons
10. Hurricane and Storm Surge Damage
11. Tropical Cyclone Theory

Forthcoming bibliography will be:

1. Solar Relations with Weather, Vol. 8, No. 1, Jan. 1957.

Other bibliographies in preparation are:

Actinometers
Fog Forecasting
Forest Micrometeorology
Microwave Propagation
Night Airglow
Ozone
Singularities
Synoptic Aerology

Part III contains a listing of reviews, and the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where material may be found. The Union List of Serials (Gregory) is the source of most symbols used. In some cases, where no symbol has been assigned to a library, one was devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by cha

Geographic locations are in the English form rather than the form used locally, for exam Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless other stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Nun (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thu entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

See also: **Accidents and weather** (Schröder et al.), 7.11–80; **Poliomyelitis, pathological and clinical aspects** (Dönhardt et al.), 7.11–91.

7.11–1 551.5(082)

†Academia Sinica, **Collected scientific papers, 1919–1949, Vol. 1, Meteorology.** (European anguage ed.) Peking, China, **1954.** 625 p. figs., tables, bibliog. throughout. **DLC**—A nonumental volume containing reprints of 25 (out of a possible 400) meteorological papers, ncluding 10 papers on synoptic meteorology of China, 7 on climatology, and 8 on dynamic neteorology and general circulation over the Far East. Each of the following authors have :ontributed several papers: Chang-Wang Tu (4), Co-Ching Chu (2), A. Lu (3), Sjan-Zsi .i (2), Jeou-Jang Jaw (2), Pao-Kun Chang (2) and 10 other authors, one each. Chinese irticles have been translated into English, and articles originally in foreign languages translated nto Chinese for the Chinese edition. The purpose of the collection is to emphasize the ichievements of Chinese scientists of the last 30 years, and to encourage young scientists to nake greater efforts in the future. This is the first of a series of such collections on natural :cience. The papers (3 of which are in German) are carefully selected and of high quality, heoretically, synoptically or statistically. The earliest papers were published in 1931, the nost recent in 1949. The original sources were such well known periodicals as **Gerlands Beiträge, Journal of Meteorology, Meteorological Magazine** (Nanking) and **Memoirs of the National Research Institute of Meteorology** (Nanking). Subject matter ranges from ty-)hoons, extratropical cyclones or cold waves of China, to long range forecasting of floods and droughts, southeast monsoon and rainfall climatic regions, air circulation, climatic changes, ind air masses of China. Many sample synoptic charts, streamline charts and a quantity of abular data are included. (For contents, *see* 7(6):791, June 1956, *MAB.*) *Subject Headings:* **. Collected meteorological papers 2. Synoptic case history studies 3. Climate of China i. China. I. Chu, Co-ching** *(ed.).*—*M.R.*

7.11–2 551.508.26(08):536.5

†American Institute of Physics, **Temperature: its measurement and control in science nd industry.** Vol. 2, ed. by Hugh C. Wolfe. N. Y., Reinhold Pub. Corp., **1955.** 467 p. igs. (inc. photos), tables, biblios. and eqs. throughout. "Papers presented at the 3rd Sym-)osium on Temperature, Wash., D. C. Oct. 1954." Vol. 1 consisted of papers presented it the earlier meeting, Second Symposium, 1939, and pub. 1941. **DWB, DLC**—Includes: 'ayne-Gaposchkin, Cecilia, **Astrophysical temperatures,** p. 31–59. Stimson, H. F., **Precision esistance thermometry and fixed points,** p. 141–167. Hoge, Harold J., **Temperature measure-nent in engineering,** p. 287–325. Brickwedde, F. G., **Temperatures in atomic explosions,**). 395–412. Newell, Homer E., Jr., **Temperatures in the upper atmosphere,** p. 429–444. At the symposium, about 25 papers on all aspects of thermometry or pyrometry at extremely igh and low temperatures, and indirect methods of measuring temperature (such as by sound)ropagation or meteor trail study for the upper atmosphere), astrophysical temperatures and heir measurement, standards and scales, thermodynamics of irreversible processes, tem-)eratures near absolute zero, hot gas or flame temperature, engineering thermometry, tem-)eratures in atomic explosions, magnetic and optical thermometry, ionization measurements .t high temperatures, etc. were presented. Pertinent articles will be abstracted separately. *Subject Headings:* **1. Thermometry 2. Temperature measurement symposia. I. U. S. Na-**

tional Bureau of Standards II. U. S. Office of Ordnance Research III. Wolfe, Hugh (*ed.*).—*M.R.*

7.11–3 551.585.5

International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceed** pub. Jerusalem, **1953.** 641 p. figs., tables, bibliogs., refs. Issued as *Research Counc Israel, Special Publication,* No. 2, **1953. DWB**—This conference, which was held in 1952 in Jerusalem, was sponsored by the Research Council of Israel and UNESCO. papers delivered fall into the following categories: climate, biology, soils, water and er and miscellaneous. The contents of this volume appears in this issue of *MAB,* p. 1 and numerous pertinent items have been abstracted separately. *Subject Headings:* **1. zone research 2. Symposia. I. Research Council of Israel II. UNESCO.**—*I.L.D.*

7.11–4 551.5

†Kuiper, Gerard P. (*ed.*), **The earth as a planet.** Chicago, Univ. of Chic. Press, 1 751 p. figs., photos, tables, bibliogs. throughout. **DLC**—The 15 articles collected arranged in a logical order in this "Compendium" on the astrophysical aspects of the ea cover the dynamics of the earth as a planet, the structure of the earth's interior, the ear crest, mountains, etc., the oceans, geochemistry, upper atmosphere, biochemistry and properties of the upper atmosphere that would aid in studies of other planets or stars analogy. Of special interest to meteorologists are the following chapters: Sverdrup, H. **Oceanography,** p. 215–257. Byers, H. R., **Atmosphere up to 30 kilometers,** p. 298– Hutchinson, G. E., **Biochemistry of the terrestrial atmosphere,** p. 427–433. Goldberg, **Absorption spectrum of the atmosphere,** p. 434–490. Whipple, Fred L., **Density, press and temperature data above 30 kilometers,** p. 491–513. Chamberlain, J. W. and Meinel, A. **Emission spectra of twilight, night sky, and aurorae,** p. 514–575. Bates, D. R., **Physics of upper atmosphere,** p. 576–643. Nicolet, M., **Dynamic effect in the high atmosphere,** p. 6 712. Holliday, Clyde T., **The earth as seen from outside the atmosphere,** p. 713–725. D jon, André, **Albedo, color and polarization of the earth,** p. 726–738. *Subject Headings:* **1. Ea as a planet 2. Upper atmosphere physics.**—*M.R.*

POPULAR SCIENCE BOOKS

7.11–5 551.508.53/4 551.556.3:621.311.24 (

†Golding, Edward William, **Generation of electricity by wind power.** London, Sp Ltd., **1955.** 318 p. 101 figs. (incl. photos), 38 tables, bibliog. p. 295–305; refs. at end most chapters, eqs. Price: 50 s. **DWB.** Also review of above: Marshall, C. W., **Power a energy from the winds.** *Nature,* London, 177(4519):1050–1051, June 9, **1956. DWB**— technical or engineering type of book surveying the results of research and development dur the past decade or so in Great Britain and other countries, in the field of wind power utilizati The subject is treated under three general divisions: 1) wind and its distribution and measu ment, 2) wind machines, and 3) economic aspects of wind power utilization. The separa chapters cover history, energy available, character and distribution of wind, wind power sit wind surveys, wind flow over and around hills, measurement of wind speed and directi wind structure and its measurement, wind data and energy estimation. The last two chapt deal with research and development on wind behavior, and on international cooperation. bibliography of surface wind data in 45 countries is arranged under the several continents country. A French, English and German glossary is included. *Subject Headings:* **1. Wi power textbooks 2. Wind surveys 3. Wind bibliographies.**—*M.R.*

7.11–6 551.510.535:551.590.21 (0

Hachenberg, Otto, **Sonnentätigkeit und Ausbreitung der elektrischen Wellen in Erdatmosphäre.** [Solar activity and propagation of electrical waves in the earth's atm sphere.] Leipzig, Urania-Verlag, **1955.** 27 p. 10 figs. *Gesellschaft zur Verbreitung Wiss schaftlicher Kenntnisse. Vortragsreihe Naturwissenschaften,* Vol. 13. **DLC**—A pamph giving the basic material, with illustrations, of a popular science lecture on the ionosphe

tructure, ionospheric propagation of radio waves and sounding by impulses or waves, and olar ionizing influences on the ionosphere. The separate layers (D, E, F1 and F2) and their ormation are treated in detail, and records are reproduced showing variations and character- tics of these layers, or of disturbances in the layers. *Subject Headings:* **1. Solar influences n ionosphere 2. Ionospheric structure 3. Popular meteorology lectures.**—*M.R.*

7.11–7 551.5(023)

Hader, Fritz, **Wolken, Wind und Wetter: eine Wetterkunde für Jedermann.** [Clouds, ind and weather: meteorology for everyman.] Vienna, Österreichische Buchgemeinschaft, **947.** 204 p. figs., tables, numerous photos. **DLC**—A popular treatment of the elements f meteorology (clouds, wind, weather, singularities, weather conditions) in western, eastern nd southern Europe, climate and climatic changes. A great deal of emphasis is placed on louds, föhn winds and weather which would be encountered in Alpine regions, aviation eteorology and synoptic weather types. A few illustrative synoptic charts are "pasted in" nd 15 excellent cloud photos taken while flying over the Alps are appended. A good subject ndex is provided. This book should not be confused with the one by RUDOLF HÖHN (*see* .11–8 below) with similar title. *Subject Headings:* **1. Popular meteorology books 2. Cloud hotography 3. Mountain effects 4. Europe.**—*M.R.*

TEXTBOOKS AND TECHNICAL BOOKS

7.11–8 551.5(26)(02)

Höhn, Rudolf, **Wetter, Winde, Wolken: eine Wetterkunde für Jedermann, insbesondere ür Seefahrer.** [Weather, winds, clouds: meteorology for everyman, especially for the mar- ner.] Leipzig, Fachbuchverlag, **1955.** 124 p. 50 figs., 18 cloud pictures, 11 refs. **DLC**—his is a nicely illustrated but more technical text than the one by FRITZ HADER (*see* 7.11–7 bove) with nearly the same title. It is actually a textbook on marine meteorology with hapters on the structure, solar energy, heat exchange, water vapor distribution and exchange, loud and precipitation formation, thunderstorms and electric phenomena, pressure, wind, eneral circulation, temperate zone weather (air masses, fronts, etc.), tropical hurricanes, pecial weather conditions at sea (visibility, haze, fog, wind at sea and on coast, sea and swell), eather observations at sea (pressure, temperature, water temperature, humidity, wind, tate of sea, weather clouds and visibility), ship weather service and reports, weather maps and orecasts on vessels, etc. Charts and photographs are excellent and many are in color. *Subject leadings:* **1. Marine meteorology textbooks 2. Textbooks.**—*M.R.*

7.11–9 551.509.33(02)

†*Isaev, E. A., **Sinopticheskie protsessy nad Atlanticheskim okeanom i Evrazieĭ.** [Syn- ptic processes over the Atlantic Ocean and Eurasia.] Leningrad, Gidrometeoizdat., **1955.** 10 p. 65 figs. and charts, 45 tables, 41 refs. **DLC**—A systematic textbook on synoptic ethods of long range or medium range forecasting. The work is based on the author's xperience in long-range forecasting since 1941. It follows after the Multanovskiĭ school ut goes into much greater detail with respect to use of upper level charts of 700 mb baric opography, circulation type frequencies in various seasons or inter-seasonal periods, mean irculation charts, etc. Appendix gives actual frequency of types and subtypes during each onth of each year from 1898–1938, and contains an analysis and description of the use of ese statistics. Each type and subtype are illustrated by numerous composite charts for urasia. *Subject Headings:* **1. Long range forecasting textbooks 2. Circulation type calendars . Synoptic processes over Eurasia 4. Composite charts 5. Synoptic climatology 6. U.S.S.R. . Eurasia.**—*M.R.*

7.11–10 551.511(02)

Panofsky, Hans A., **Introduction to dynamic meteorology.** University Park, Mineral ndustries Extension Services, College of Mineral Industries, Pennsylvania State Univ., **1956.** 43 p. 59 figs., 251 eqs. **DLC**—This is a condensed text on the principles of modern dynamic eteorology for the practicing forecaster or the upper class college student. The first chapter eviews the basic mathematical aspects (calculus, vectors, etc. applied to geopotential, isen-

tropic, streamline, trajectory, divergence, circulation and vorticity problems). Ch. 2 ta up the fundamental physical laws used in meteorology (ideal gas law, equations of mot continuity, moisture and thermodynamics). Ch. 3 goes into relation between thickn temperature and wind field, stability changes, vorticity and pressure tendency equatio Ch. 4, wave theory (perturbations); Ch. 5, dynamic forecasting and examples used in numer prediction; Ch. 6, turbulence, evaporation, etc. and Ch. 7, theories of general circulat Some of the derivations are given in appendix. Each chapter has a summary in nonmat matical and one in mathematical terms and a few references. *Subject Headings:* **1. Dyna meteorology textbooks 2. Textbooks.**—*M.R.*

7.11–11 551.521:551.586:016(

*†Precht, H.; Christophersen, J. and Hensel, H., **Temperatur und Leben.** [Temperat and life.] Berlin, Springer-Verlag, **1955.** 514 p. 182 figs., numerous tables, foot-refs. a eqs. **DWB**—An extremely detailed and technical coverage of scores of aspects of the eff of temperature on all manner of living organisms or on things affecting living organis beginning with the temperature effect on basic protoplasm, enzymes, vitamins, spores, sper blood, seeds, blood, nervous tissue, and going on with effects on bacteria, insects, cold blood and warm blooded animals, plants, etc., and including consideration of abnormally high a abnormally low temperatures, adaptation or heat or cold regulation, ice formation, dehydrati effect on non-sweating and sweating animals, lethal temperatures for various types of organis or animals, hibernation, hypothermy, daytime lethargy (i.e., bats), metabolism, sperma genesis, hormonal action, poison assimilation, disease migration, geographical distributio body size or activity, tropical climates, desert climates, polar climates, pasteurization, nutritio incubation, ageing, clothing, agriculture, fertilizing, food, humidity, evaporation, pH, a effect of radiation on some of these forms. Hundreds of tables, graphs, charts and schema diagrams are included throughout the text, and equations are given where needed. At lea 2500 authors are cited on 3000 subjects and about 1500 different organisms, as can be se in the excellent author, subject and organism indexes. In all, the work constitutes one of t most comprehensive reviews of the technical literature and presentation of quantitative data the subject ever attempted. *Subject Headings:* **1. Temperature and life 2. Bioclimatolo bibliographies 3. Acclimatization 4. Textbooks.**—*M.R.*

7.11–12 551.57(0

*†Zamorskiĭ, Aleksandr Dmitrievich, **Atosfernyĭ led, ineĭ, gololed, sneg i grad.** [A mospheric ice, frost, rime, snow and hail.] Moscow, Izdat. Akademii Nauk SSSR, **1955** 376 p. 172 figs., 79 tables, bibliog. p. 355–365. At head of t-p: Akademiia Nauk SSS Geograficheskoe Obshchestvo SSSR. **DLC**—This excellent technical text, which is based on review of hundreds of native and foreign works (cited in bibliography), deals with the process of formation of the various classes or types of ice, and with the varieties of ice themselve The formation of ice of various types on the earth and on objects on the earth, ice formatio in the atmosphere and falling on the earth (snow, graupel, hail, sleet, freezing rain); th morphology of snow crystals, processes of snow crystal formation, conditions attending fallin snow (relation to air temperature, cloud form, air mass, etc.) and many other aspects of sno or ice occurrence are taken up in considerable detail. About 130 works of >100 weste authors were cited in the text. *Subject Headings:* **1. Atmospheric ice 2. Rime 3. Sno 4. Hail 5. Frost.**—*M.R.*

MONOGRAPHS AND COMPREHENSIVE PAPERS

See also: **Wind forecast accuracy** (O'Carroll), 7.11–73; **Field of motion and weather** (Ohmstede, Dean), 7.11–231; **Floods in Illinois** (Mitchell), 7.11–265.

7.11–13 551.577(410)(058

British Rainfall 1954. Report on the distribution of rain in space and time over Grea Britain and Northern Ireland during the year 1954 as recorded by about 5,000 observer *Great Britain. Meteorological Office, M.O.* 609, **1956.** 215 p. numerous maps and table **DWB, DLC**—This volume contains all the usual features. The year was wet as a whol

123% of average), being above normal everywhere except the Thames estuary and exceeding 50% of normal in Westmoreland and Lancashire; only April was dry over the whole country. The largest annual total was 257″ in Cumberland, the smallest 19.8″ in Essex. The largest daily fall was 6.02″ at Loch Quoich. On Oct. 18, 1.75″ fell in 25 min at Ulpha, Cumberland. Evaporation was considerably below normal. *Subject Headings:* **1. Rainfall data 2. Precipitation data 3. Annual meteorological reports 4. Great Britain 5. Ireland. I. Great Britain. Meteorological Office.**—*C.E.P.B.*

7.11–14 551.577.37(675)

Bultot, Franz, **Étude statistique des pluies intenses en un point et sur une aire au Congo Belge et au Ruanda-Urundi.** [Statistical study of intense rains at a point and over an area in Belgian Congo and Ruanda-Urandi.] *Institut pour l'Étude Agronomique du Congo Belge. Bureau Climatologique, Communication*, No. 11, **1956.** 90 p. 19 figs., tables, 19 refs., eqs. **DLC**—In this elaborate statistical study Ch. 1 analyzes the frequency of daily rainfall at Eala, 1925–1953. Cumulative frequencies are fitted by $N=2965.53(0.9434)^x$, where x is daily fall in mm. The range of variation of falls ≥ 15, 50 and 80 mm in individual years is represented graphically and the maximum daily falls in given periods estimated. The monthly frequencies of days ≥ 15 and 50 mm and frequencies of runs of 1–4 days ≥ 15 mm are given. Ch. 2 extends the analyses to a number of other stations in Belgian Congo and Ruanda-Urundi; there is a progressive diminution from west to east. In Ch. 3 rainstorms of duration 5–240 min at a number of stations are discussed and expressions of the form $ab/(b+t)$ fitted. The diurnal variation of frequency, and the frequency of different durations are plotted; night rains last longer than day rains. Ch. 4 deals with total rainfall over areas of 116 and 2715 km². *Subject Headings:* **1. Excessive precipitation 2. Rainstorms 3. Belgian Congo.**—*C.E.P.B.*

7.11–15 551.510.42:551.575.1:541.14

*Leighton, Philip A. and Perkins, William A. (*both, Stanford Univ.*), **Solar radiation, absorption rates, and photochemical primary processes in urban air.** *Air Pollution Foundation Los Angeles, Calif., Report*, No. 14, March **1956.** 129 p. 21+1 figs., 25+2 tables, 122+10 refs., 80+13 eqs. **DWB**—An extensive monograph giving results of research on solar radiation absorption rates in the atmosphere and diffusion within a polluted layer; photochemical processes related to absorption rates for O_2, O_3, NO_2, SO_2, HNO_3, aldehydes, ketones, peroxides, etc. Conclusion is that photodissociation (in all wave lengths) of NO_2 into NO+O is the probable initial step in using solar energy for smog production, although other compounds are involved. *Subject Headings:* **1. Photochemistry of smog 2. Radiation absorption rates 3. Smog 4. NO_2 photodissociation.**—*M.R.*

7.11–16 551.509.31

§Fujita, Tetsuya; Newstein, Herman and Tepper, Morris, **Mesoanalysis: an important scale in the analysis of weather data.** *U. S. Weather Bureau, Research Paper*, No. 39, Jan. **1956.** 83 p. 8 figs., 15 plates, numerous diagrs., foot-refs. **DWB**—The technique of mesoanalysis of synoptic data is demonstrated by a complete analysis of the weather situation of June 24–25 ,1953 (involving development of a pressure jump line) from data of the 195-station Severe Local Storm Research Unit network operating in 10 midwestern states since 1951. From the basic pressure, temperature, wind, precipitation, cloud, radar and upper-air data and severe storm reports, hourly mesomaps are constructed, showing details of the synoptic development. It is found that the macroscale cold front position does not appear on the mesomaps as a continuous front separating one regime of meteorological elements from another; significant medium-scale systems, completely lost in ordinary synoptic analysis, can be identified on the mesomaps and followed from hour to hour. These medium-scale features are characterized by the intensity of the gradients of meteorological elements, especially pressure and temperature. Most severe weather phenomena appear to be associated with such mesofeatures. In addition to the colored mesomaps (including an upper air chart superimposed on the surface chart), the complete data material is presented in 195 diagrams (one for each of the 67 regular and 128 cooperative stations) in an appendix occupying almost half of the report. These station time sections contain microbarograms, temperature traces and values

of cloudiness, precipitation, thunderstorms, wind and other elements for the regular stat and pressure (or pressure and temperature) traces for the cooperative stations. *Su Headings:* **1. Mesoanalysis 2. Synoptic analysis. I. Chicago Univ. II. Contract AF 19 618.**—*G.T.*

7.11–17 551.510.41:546.264:551.583.3:551.31

†Plass, Gilbert N. (*Johns Hopkins Univ.*), **The carbon dioxide theory of climatic cha** *Tellus*, Stockholm, 8(2):140–154, May **1956.** fig., table, 27 refs., 7 eqs. **DLC.** Also **Effect of carbon dioxide variations on climate.** *American Journal of Physics*, N. Y., 24(5): 387, May **1956.** fig., table, 19 foot-refs. **DLC.** And his **Carbon dioxide and the clim** *American Scientist*, 44(3):302–316, July **1956.** fig., 15 refs. **DLC**—Infrared absorption CO_2, water vapor and ozone largely determines the climate, and the three are to a large ex independent. The present amount of CO_2 is 2.3×10^{12} tons in the atmosphere; if it doul surface temperature would rise by 3.6°C; if it were halved, temperature would fall by 3. At present the factors affecting the amount are in equilibrium except for consumptio fossil fuel, which is adding 6×10^9 tons a year. There are 132×10^{12} tons in the ocean CO_2 and carbonates, but if the balance with the atmosphere were disturbed it would about 10,000 years to restore. If CO_2 in the atmosphere were halved, glaciation would oc The volume of the oceans would be reduced by 5%, and CO_2 would be liberated. Tempera would rise and the ice would melt. The oceans would again absorb CO_2 from the air, starting the cycle. This explains the instability of climate during ice ages. Moun building liberates much CO_2 but also exposes large areas of igneous rock to weathering. A some millions of years the amount of CO_2 falls and glaciation begins. The end of glaciat comes when decrease of chemical weathering allows CO_2 to increase. When all known c and oil is used up, CO_2 will have increased tenfold and temperature risen by 7–13.4°C. Ra carbon dating assumes that atmospheric CO_2 has been constant; if this is incorrect dates be wrong. Changes of water vapor content increase the effect of changes of CO_2. *Sub Headings:* **1. Carbon dioxide variations 2. Climatic changes 3. Glacial periods.**—*C.E.P.*

7.11–18 551.501.9:551.501

§†World Meteorological Organization, **Atmospherics techniques.** Its *Technical N* No. 12; *WMO*, No. 44, *TP.*17, **1955.** 42 p. 11 figs., 4 tables, 35 refs. **DWB**—A gene survey of the synoptic, operational and observational aspects of sferics, with brief notes the history, definitions of terms and a bibliography of some of the most comprehensive or m recent works in this field. Observational techniques, equipment and uses in aviation a electrical or radio engineering in the U.K., France and Switzerland and by the U. S. Air Weat Service, are treated more extensively with illustrations of equipment, networks, sferics cha (of Western Europe), and synoptic examples (with charts) of analyses using several sfer reports for evaluation and comparison of techniques. Several comparisons were made the British, Swiss and U. S. Air Weather Service) of the various systems (Cathode Ray Dir tion Finder or CRDF and Narrow-Sector Recorders or NSR), with conclusion that the CRI gives results in 2 min comparable to those of the NSR which requires 20–30 min but less st and less attention. The CRDF is used by British, French, U. S. Air Force and in Germa Japan and Sweden. The NSR system is used in France, Switzerland and N. Africa. It recommended that sferics tests be extended to tropical areas and that networks be set which cross national boundaries. *Subject Headings:* **1. Sferics networks 2. Sferics tec niques 3. Western Europe.**—*M.R.*

MANUALS AND HANDBOOKS

7.11–19 551.508(0

†*Great Britain. Meteorological Office, **Handbook of meteorological instruments, Pt. Instruments for surface observations.** Its *M.O.* 577, **1956.** 458 p. 132 figs., 53 plate 57 tables, 80 refs., 91 eqs. **DWB, DLC**—This exhaustive and well illustrated book deals fir with the general requirements of meteorological instruments, recording, corrections, oper tional procedure and transport. Ch. 2 describes mercury and aneroid barometers and bar graphs, the SHAW-DINES microbarograph and standard barometers. Ch. 3 deals with the

nometers (liquid-in-glass, resistance, thermocouples, bimetallic, mercury-in-steel) and photographic thermographs, tests and calibration. Ch. 4 covers psychrometers, hair hygrographs and electrical absorption and resistance types. Ch. 5 describes wind vanes, cup and fan anemometers and pressure tube anemographs; Ch. 6, nonrecording and recording raingages, and measurement of snow and dew, and Ch. 7 the evaporation tank, Piché and porous porcelain evaporimeters, and small evaporation pans. In Ch. 8 brief descriptions are given of the Marvin and Jordan sunshine recorders and a full account of the Campbell-Stokes, with full operational details, tropical model, starshine recorder for night cloud, and a number of instruments which measure solar radiation. The selection of visibility objects for daytime use and visibility of lights at night, visibility meters, the Loofah haze meter and the Waldrum range meter, make up Ch. 9. Ch. 10 describes instruments for measuring cloud amount, height and movement, cloud searchlights, pilot balloons for cloud height, and cloud cameras. Ch. 11 deals with instruments for use at sea. Ch. 12 covers miscellaneous subjects—inspector's kits and testing instruments, geostrophic wind scales and calculating machines. A full range of barometer correction and reduction tables completes the book. *Subject Headings:* **1. Instrument manuals 2. Meteorological instruments.**—*C.E.P.B.*

7.11–20 551.501.81 :551.509.34 :629.13 :359

Great Britain. Naval Weather Service, **Radar weather echoes and their application to weather forecasting.** Its *Memo*, No. 154/54, May **1954.** 40 p. 14 figs., 16 plates, 2 tables, 14 refs. Mimeo. **GB-MO**—Radar echoes due to back-scattering by water particles depend on the characteristics of the radar set, reflectivity increasing as wave-length λ decreases, and on the size, shape, concentration and state (water or ice) of the particles; equations are given. Methods of presentation are described. With $\lambda \geq 3$ cm echoes are seldom received from non-precipitating clouds. Weather echoes are classified and the bright band discussed. Echo characteristics at sea of air masses, fronts, thunderstorms and standard synoptic situations are described and illustrated by diagrams and photographs. Echoes give information about upper winds and wind shear, inversions, turbulence, cloud structure and icing risk. They are useful for short period forecasts, avoiding worst flying regions, finding cloud cover, etc. *Subject Heading:* **1. Radar precipitation echoes.**—*C.E.P.B.*

7.11–21 551.501 :551.557.2 :532.72

Leighton, Philip A., **The Stanford fluorescent-particle tracer technique: an operational manual.** Stanford Univ. Dept. of Chemistry, Contract DA-18-064-cml-2564, [Unnumbered Report], June **1955.** 153 p. 39 figs. (incl. photos), tables, eqs. **DWB**—The fluorescent-particle tracer technique was first used successfully in Oct. 1947 for distances up to 600 ft. By 1949 it was used for 1 or 2 mi, and more recently up to 50 or 100 mi. The present manual describes the tracer material, dispersal equipment, sampling methods and evaluation of results, appendices give operating instructions for generators, samplers and monitoring devices. The manual is quite complete and is amply illustrated with photographs of equipment plainly annotated. Requirements for materials dispersal, sampling, etc. are set forth in detail under each respective heading. *Subject Headings:* **1. Fluorescent particle tracer technique 2. Diffusion 3. Air trajectory tracing.**—*M.R.*

7.11–22 551.509.2 (084.4)

§*U. S. Air Weather Service, **Atlas of the 700 MB five-day-mean Northern Hemisphere anomaly charts (to accompany AWS Technical Report 105-100/1).** Its *AWS Technical Report*, 105-100/2, July **1955.** 39 p. almost entirely charts, 20″×20″ (mostly in color). **DWB**—A large atlas, to be used as an upper air synoptic climatology aid to forecasters, with 4–9 charts to each page, showing: 1) normal monthly 700-mb contours taken from *USWB Technical Paper*, No. 21; 2) average selected charts showing 5-day mean 700-mb extreme height anomalies for about 50 key areas with both + and − anomalies, during Dec. Feb.; and 3) charts showing percent of occurrence of + or − anomalies of 5-day mean 700-mb values in key areas, for Nov.–March, and May–Sept. (54 charts for each type of anomaly for each season). The charts cover the entire Northern Hemisphere, with key areas at 40°, 50° or 60°N, and 20° longitude intervals. Quite often a key area (100%+ or − anomaly) is bracketed by 80 90% anomalies of the opposite sign, or with a single anomaly of opposite

sign to the east or west of the key area. Often, too, there is no apparent anomaly anyw
else in the hemisphere. *Subject Headings:* **1. Northern Hemisphere upper air charts 2. U
air anomaly charts 3. Synoptic climatology 4. Atlases of synoptic charts 5. North
Hemisphere.**—*M.R.*

7.11–23 551.509.5

U. S. Air Weather Service, **Some techniques for deriving objective forecasting aids
methods.** Its *AWS Manual*, 105-40 (rev.), April, **1955.** 51 p. 17 figs., tables, 10 refs., e
DWB—A manual to guide Air Weather Service forecasters in preparation and use of objec
forecast studies or aids to assist the experienced forecaster, as well as the man new to a reg
in making subjective forecasts, and to develop objective methods which will give an act
forecast. Systematic procedures suggested by J. J. GEORGE are outlined, and examples
purely yes or no objective techniques (ceiling and visibility, advection-radiation fog, precip
tion and thunderstorm forecasting) and finally objective techniques for forecasting "wh
and "how much", are taken up in separate sections of the manual. Numerous statistical (sca
chart) examples and verifications of actual cases, check lists, graphical procedures, etc.
presented and discussed. *Subject Heading:* **1. Objective forecasting manuals.**—*M.R.*

7.11–24 551.501.1 (

U. S. Weather Bureau, **Manual of surface observations, abridged (for CAA station
From its *Circular N*, 7th ed., Jan. **1955.** 99 p. forms, figs., tables. **DWB**—This abridgme
is in handy form for quick reference and is neatly printed. It contains chapters on clou
visibility, "weather," precipitation, temp., humidity, pressure, wind, special observatio
coding and transmission, recording forms (WBAN-10 for CAA) and pilots' reports. Co
version and coding tables are profusely included or appended and records illustrated. (F
the unabridged (WBAN) edition, *see* 6.11–9, Nov. 1955, *MAB.*) *Subject Headings:* **1. O
servers manuals 2. C.A.A. observers.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

IGY AND I.U.G.G.

See also: **Studies of a minimum orbital unmanned satellite . . .** (Singer), 7.11–123.

7.11–25 551.510.535 551.594.13:551.510.535 551.557:551.510.53

Gautier, T. N. (*National Bur. Standards, Wash., D. C.*), **The ionosphere.** *Scientif
American*, N. Y., 193(3):126–138, Sept. **1955.** figs. **DWB, DLC**—After reviewing brief
the history of the more important research on the ionosphere since BALFOUR STEWART, th
author discusses the physical characteristics of the ionosphere including electron densities
the various layers and the relationship between electron densities and change in the ionosphere
the relationship with magnetic storms, the nature and causes of oscillations in the ionc
sphere, and distribution of ionospheric winds. The ionospheric program during the Inter
national Geophysical Year is outlined. *Subject Headings:* **1. Ionosphere 2. Ionospheri
electron density 3. Ionospheric winds 4. International Geophysical Year ionospher
program.**—*I.L.D.*

7.11–26 550.3:061.

**Il reunion plenaria del Comité Especial del Anõ Geofísico Internacional 1957–58, Roma
30 Sept.–4 Oct., 1954.** [Meeting of the Special Committee of the International Geophysica
Year, 1957/58, at Rome, Sept. 30–Oct. 4, 1954.] *Urania*, Barcelona, 40(204):17–148, Jan.
June **1955. DWB, DLC**—The complete transactions of the CSAGI meeting at Rome (which
followed the I.U.G.G. assembly in Sept. 1954) are given *in extenso* in Spanish, together with
the resolutions of CSAGI and the 13 sections (World Days, Meteorology, Aurora, Cosmi
Rays, Rockets, Publications, etc.). Photograph of group present, names of participants
maps showing paths of 3 eclipses during IGY, 1957/58, and lists of proposed stations are

ncluded. *Subject Headings:* **1. CSAGI meeting, Rome, 1954 2. International Geophysical Year program.**—*M.R.*

7.11–27 550.3:061.3

Kalashnikov, A. G., **Issledovaniia Sovetskikh uchenykh v Mezhdunarodnom geofizicheskom godu.** [Investigations of Soviet scientists in the International Geophysical Year.] *Priroda*, Moscow, 45(5):27–34, May **1956.** 3 charts, refs. **DLC.**—Lists and discusses projected activities in the dozen fields to be covered by IGY-1957/8, and presents 3 charts of the U.S.S.R. and vicinity, and the Antarctic, showing the distribution of observation stations of the following types: Fig. 1. [Meteorological, glaciological and oceanographic network.] Symbol 1. Aerological stations; 2. Oceanographic coastal stations; 3. Glaciological stations; 4. Actinometric stations; 5. Ozone stations. Fig. 2. [Magnetic and geodetic network.] 1. Auroral stations; 2. Magnetic observatories; 3. Vertical ionospheric sounding stations; 4. Meteoric stations; 5. Cosmic ray stations; 6. Latitude stations; 7. Latitude and longitude stations; 8. Gravimetric stations. Fig. 3. Charts of regions of Soviet oceanographic studies (80 areas) in North Atlantic, Antarctic, Pacific and bordering seas, and Behring Sea. *Subject Headings:* **1. International Geophysical Year, 1957–1958 2. Russian participation in IGY.**—*M.R.*

7.11–28 550.3:061.3

Schumacher, A. and Errulat, F., **Aus den Verhandlungen der Internationalen Union für Geodäsie und Geophysik in Rom in September 1954.** [From the reports of the I.U.G.G. in Rome, Sept. 1954.] *Deutsche Hydrographische Zeitschrift*, 8(6):251–256, **1955. DWB**—Summaries are given of the Reports of the Association for Physical Oceanography and the Association for Geomagnetism and Geoelectricity (which has changed its name to "Association for Geomagnetism and Aeronomy"). *Subject Heading:* **1. International Union of Geodesy and Geophysics.**—*C.E.P.B.*

WMO

See also: **4th World Forestry Congr.** (Mallik), 7.11–85.

7.11–29 551.5:061.3

World Meteorological Organization. Regional Association I (Africa). Working Group on Radiation, Leopoldville, Aug. 19–20, 1954, **Report of the First Session.** Pretoria, April **1955.** 55 p. tables. **DWB**—The conference was attended by 10 representatives from Belgian Congo, South Africa and French Equatorial Africa. The agenda (22 items), documents (62), transactions, resolutions (9), recommendations (6) are listed. The resolutions, etc. are given in full, and 11 of the documents and reports are appended. All had to do with measurement of radiation, networks, stations, instruments, comparisons of actinometers and pyrheliometers, presentation and publication of data for Region I. *Subject Headings:* **1. Radiation working group meetings 2. WMO. Regional Association I (Africa).**—*M.R.*

7.11–30 551.5:061.3

Sutton, Sir Graham, **World Meteorological Organization eighth session of the Executive Committee, April 17–30, 1956.** *Meteorological Magazine*, London, 85(1009):193–194, July **1956.** ref. **DWB**—This brief report describes the work of the Committee in supervising the WMO between sessions of its Congress. The use of micro-opaque cards for distribution of information about the Geophysical Year is described. Permanent accommodation in Geneva was arranged. The first IMO Memorial Prize was awarded to T. Hesselberg. *Subject Heading:* **1. World Meteorological Organization.**—*C.E.P.B.*

7.11–31 551.5:06

Sreenivasaiah, B. N. (*Sec., First Session of the WMO R.A. II*), **First session of the Regional Association II (Asia) of the World Meteorological Organization.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(2):85–96, April **1955.** 8 photos. **DWB, DLC**—A summary of the agenda of this session of the Regional Association of the WMO is presented. It covered the standardization of meteorological instruments, the network of observations in Asia,

meteorological codes and telecommunications, preparation of a climatological atlas. The various resolutions passed are cited. Photographs of various aspects of the confe are reproduced. *Subject Headings:* **1. Meteorological conferences 2. WMO. Reg Association II (Asia).**—*I.L.D.*

EXPEDITIONS—ARCTIC AND ANTARCTIC RESEARCH

See also: **Antarctic bibliog.** (Kosack), 7.11–61; **Upper air measurements with rockets, Arctic** (La Gow, Ainsworth), 7.11–124; **Hydrography, Antarctic Ocean** (Hasle), 7.11–207.

7.11–32 551.311.17:91.04

Hamilton, R. A. et al., **British North Greenland expedition 1952–4: scientific res** *Geographical Journal*, London, 122(2):203–240, June **1956.** figs., maps, tables, footnote Discussion p. 238–240. **DWB**—A meeting was held on Nov. 14, 1955, at which several pa were read by the authors or on their behalf by R. A. Hamilton. F. R. Brooke describe survey of Dronning Louise Land, J. D. Peacock the geology, and K. Arnold and S. Bow the construction of a map by vertical air photography. C. Bull dealt with seismic inves tions of the inland ice, with some data on temperature, rate of accumulation and bot melting. He gave a cross section of the inland ice cap in 77–78°N. H. Lister, Gla **regime in North-east Greenland,** p. 230–237, gave annual balance sheets of the Britannia Admiralty glaciers, showing a net loss of nearly 1 m water equivalent of ice (mainly by a tion). Snow accumulation decreased in 1900–1940 but has increased again in the pas years. *Subject Headings:* **1. British Greenland expedition, 1952 2. Greenland Ice 3. Greenland 4. Dronning Louise Land. I. Brooke, F. R. II. Peacock, J. D. III. Arnold IV. Bowater, S. V. Bull, C. VI. Lister, H.**—*C.E.P.B.*

7.11–33 91.04(235.2

Paffen, Kh.; Pillewizer, W. and Schneider, H.-J., **Forschungen im Hunza-Karakor Vorläufiger Bericht über die wissenschaftlichen Arbeiten der Deutsch-Österreichisc Himalaya-Karakorum-Expedition 1954.** [Investigations in Hunza-Karakoram: prelimin report on the scientific work of the German-Austrian expedition . . . 1954.] *Erdkun* Bonn, 10(1):1–33, Jan. **1956.** 3 figs., 10 photos, chart, 46 refs. English summary p. 1 **DWB**—This preliminary report describes triangulation, geomagnetism, geology, geom phology, glaciology and plant associations in a region around 36°N, 74°E. No geomagn anomalies were found. The avalanche glaciers on the south have receded greatly in the p few decades, the firn-basin glaciers on the north little or not at all. Movement and ablat of glaciers were measured. Weather in mid-May to mid-Aug. is briefly discussed. *Subj Headings:* **1. Expeditions 2. Karakoram Mountains.**—*C.E.P.B.*

7.11–34 91.04(235.2

Sander, R., **Die Frankfurter Himalaya-Expedition 1955.** [The Frankfurt Himala expedition 1955.] *Umschau*, Frankfurt a.M., 56(13):385–388, July 1, **1956.** 8 figs. **DLC** The various German expeditions to the Central Asian mountains are listed. The late climbed Spantik (7027 m) in the Karakorams on July 5, 1955. Glaciological, meteorologi and physiological measurements were made on the Chogo-Lungma glacier. The ascent described; it was hindered by rapid weather changes. *Subject Headings:* **1. Mountain ascen 2. Karakoram Mountains.**—*C.E.P.B.*

7.11–35 91.04(988):

Menzl-Biland. Arthur, **Der Anteil der Schweizer an der Erforschung Grönland I, Dänische staatliche Expeditionen nach Nord-Ost-Grönland unter der Führung von D Lauge Koch (1926)–1932–1954.** [The participation of the Swiss in the exploration of Gree land, Pt. 1, Danish State expeditions to N. E. Greenland led by Dr. L. Koch (1926)–193 1954.] *Polarforschung, Beiheft*, No. 1, **1956.** 24 p. **DWB**—No fewer than 74 young Swi took part in these 4 expeditions to different parts of Greenland, organized by L. Koch, first privately and then with the help of the Danish government. The names and work

hese are given in alphabetical order. They were mainly geologists, surveyors and photog-aphers but included also some geophysicists and glaciologists. *Subject Headings:* **1. Expedi-ion members 2. Danish-Swiss expeditions to Greenland, (1926)–1932–1954 3. Greenland.** —*C.E.P.B.*

7.11–36 551.556.4:581.16(211)

†Polunin, Nicholas, **Arctic aeropalynology: spora observed on sticky slides exposed in various regions in 1950.** *Canadian Journal of Botany*, Ottawa, 33:401–415, **1955.** 4 tables, 21 refs. **DLC** –Sticky slides were exposed more or less throughout the summer of 1950 in widely scattered Arctic and other northern areas including Point Barrow, Alaska, northern-central Baffin Island, Jan Mayen Island and Spitsbergen. Although the spora were generally sparse and conclusions must be regarded as tentative, it appeared that near ground level the incidence of pollen grains tended in general to coincide with the main period of flowering but that moss spores were in the air more or less throughout the growing season. Most (but by no means all) of the pollen observed could have been of local origin except in Spitsbergen, where there tended to be a preponderance of abietineous winged grains (mostly of Pinus) which were persistently caught practically throughout the brief summer although they had evidently been blown in from at least several hundred miles away. *Subject Headings:* **1. Wind transport 2. Spore distribution 3. Pollen distribution 4. Arctic.**—*Author's abstract.*

7.11–37 910.45(268)

Hennig, R., **Antike und mittelalterliche Fahrten in den hohen Norden.** [Voyages in the Far North during antiquity and the Middle Ages.] *Polarforschung*, Kiel, Ser. 3, 24(1/2):282–286, 1954, pub. **1956.** 27 refs. **DWB**—The Romans did not reach the true Arctic; JUVENAL's ice ocean was only the eastern Baltic, which freezes in winter. The gradual process of discovery by the Irish and Norse voyagers culminated with the discovery of Svalbard (Spitsbergen) in 1194. It was formerly believed that the Greenland colonies were destroyed in 1410 by climatic deterioration but it is now known that they lasted into the 16th Century. Polar exploration began again in 1553 with CHANCELLOR's voyage to the Dvina mouth. *Subject Heading:* **1. Arctic exploration.**—*C.E.P.B.*

7.11–38 551.311.17(268)

Kühn, Arthur, **Eine Hypothese über die Enstehung der Eisinseln.** [A hypothesis about the formation of ice islands.] *Polarforschung*, Kiel, Ser. 3, 24(1/2):294–295, 1954, pub. **1956.** ref. **DWB**—The ice islands are built of specially resistant ice. They originate on the coast of Ellesmere Land in a very cold arid climate. Author thinks they grow in nearly tideless fjords, reaching the floor and incorporating solid material in winter, floating again through surface thawing in summer, so forming the "annual bands." They break off during severe storms and storm waves. *Subject Heading:* **1. Ice island sources.**—*C.E.P.B.*

7.11–39 551.506.5(269):551.311.181

Herdman, H. F. P., **The Antarctic pack ice.** *Trident*, London, 17(190):57–60, Feb. **1955.** 5 figs. **DLC.** Also issued in *National Institute of Oceanography, Wormley, Surrey, England, Collected Reprints*, 3(107), Dec. **1955. DH-NO** —In late winter and early spring the area of Antarctic pack ice is probably well above 5,000,000 sq mi. Much of this vanishes in late summer but it is an important factor in Antarctic expeditions. The history of exploration of the Antarctic pack, the stages of its formation and its drift are described. *Subject Heading:* **1. Antarctic sea ice.**—*C.E.P.B.*

OBSERVATORIES

7.11–40 551.501.9(428)

Baxter, E. F., **Durham University Observatory.** *Weather*, London, 11(7):218–222, July **1956.** 3 figs. **DWB**—The astronomical and meteorological observatory is described and illustrated. Meteorological observations have been maintained since 1847, without change of site but with several changes of exposure of thermometers (north wall, shed, Glaisher stand, Stevenson screen). Extremes of temperature and some other observations are briefly

mentioned. *Subject Headings:* **1. Meteorological observatories 2. Durham Observ... Eng.**—*C.E.P.B.*

CONFERENCES AND SYMPOSIA

See also: **Temperature** (Am. Inst. Physics), 7.11–2; **Symposium on Desert Research,** 7.11–3; **4th World Forestry Congr.** (Mallik), 7.11–85; **Medical Met. Conf., Hamburg** (Schulze), **7.11–98.**

7.11–41 55:061.

Nauchnye soveshchaniia i konferentsii. [Scientific meetings and conferences.] *...teorologiia i Gidrologiia*, Leningrad, No. 4:61–62, July/Aug. **1955. DLC**—Brief descrip... of the agenda of a number of scientific meetings and conferences are presented. On M... 28–29, 1955 a Conference on Sun-Earth Problems was held in Leningrad. Papers o... relation between sun and troposphere, general circulation, etc. were delivered. The n... of the participants are listed. The State Oceanographic Institute held an interdepartm... conference on methods of constructing maps of wave fields over the oceans. The hydrol... papers presented at the scientific—technical conference of the I. V. Stalin Belorussian I... technical Institute held at Minsk March 1–8, 1955, are listed. A conference was held b... departments of hydrology and meteorology of the Chernovitz State University in associa... with the local forecasters on Jan. 25, 1955. A meeting was held in Feb. 1954 by the Scient... Technical Council of the Sverdlov Scientific Geophysical Observatory. A meeting of ed... and compilers of marine hydrometeorological yearbooks was held at the Leningrad Sec... of the State Oceanographic Institute on March 7–11, 1955. *Subject Headings:* **1. Geophys... conferences 2. Hydrological conferences 3. Meteorological conferences 4. U.S...** —*I.L.D.*

7.11–42 681.14:62...

Edwards, David B. G., **Digital computer techniques.** *Nature*, London, 177(45... 1069–1071, June 9, **1956. DWB**—Account of a convention at the Institution of Electr... Engineers, London, April 9–14, 1956. Papers of general interest as well as specialized subj... were discussed. It is noted that in the U.S.S.R. a machine has been translating Eng... into Russian since early 1955. *Subject Heading:* **1. Electronic computers.**—*C.E.P.B.*

7.11–43 551.574.1:551.577.11:06...

Fournier d'Albe, E. M., **The conference on the physics of cloud and precipitation partic... Woods Hole, Massachusetts.** *Weather*, 11(4):126–128, April **1956. DWB**—A gen... account of the 45 papers. These dealt with: condensation nuclei, including influence... meteoric dust on precipitation (negative results); ice nuclei and the formation of snow a... ice crystals; precipitation particles, and radar echoes from clouds and precipitation. *Sub... Headings:* **1. Cloud physics 2. Precipitation physics 3. Conferences.**—*C.E.P.B.*

7.11–44 551.510.4:546.2...

Eriksson, Erik (*Inst. of Met., Stockholm Univ.*), **Report on the second informal conferen... on atmospheric chemistry, held at the Meteorological Institute, University of Stockhol... May 31–June 4, 1955.** *Tellus*, Stockholm, 7(3):388–394, Aug. **1955. DLC**—The participan... at the conference are listed and the proceedings are summarized. Papers were delivered ... the history of the present network for the study of chemical climate, the CO_2 network ... Scandinavia, rate of exchange of CO_2 between air and sea, the influence of combustion of fos... fuels on atmospheric CO_2, on sampling of CO_2, atmospheric chemistry in France, practic... application of research in atmospheric chemistry, relationship between atmospheric chemist... and pollution and health, analyses techniques, etc. *Subject Headings:* **1. Atmospheric chemist... 2. Carbon dioxide in the atmosphere.**—*I.L.D.*

7.11–45 341.13:634.9(21...

Richards, P. W., **Research on the humid tropics: the UNESCO programme.** *Natur...* London, 177(4518):1010–1012, June 2, **1956. DWB**—The need for coordinated research

explained. A symposium at Kandy on March 19–21, 1956, on **The study of tropical vegetation** was followed on March 22–24 by a preparatory meeting of specialists which laid down a program for a permanent Humid Tropics Advisory Committee. *Subject Headings:* **1. UNESCO Advisory Committee on Humid Tropics 2. Tropical forest regions.**—*C.E.P.B.*

SERVICES

7.11–46 551.5:06(058)(66)

British West Africa. Meteorological Services, **Annual Report, 1953.** pub. Lagos, [1955?] 24 p. tables. **DWB**—A detailed report on various activities of the British West African Service as a whole, of the headquarters at Lagos, Nigeria, and of the regional services of Gambia (Bathurst), Gold Coast (Accra), Nigeria (Lagos), and Sierra Leone (Freetown Airport). Substations comprise group stations, synoptic stations, second order synoptic stations, agricultural, climatic, and rainfall stations. Pilot balloon observations are made at 15 stations, radiosonde observations at Ikeja (Lagos), radar wind and radar storm detection (to be installed) at Kano, Nigeria. Publications, international activities, personnel organization, finances, library at headquarters in Lagos (1822 accessions in 1953), forecast service, etc. are discussed. *Subject Headings:* **1. Annual service reports 2. British West Africa.**—*M.R.*

7.11–47 551.5:061

Aufgaben und Tätigkeit des Seewetteramtes des Deutschen Wetterdienstes. [Duties and activity of the Marine Office of the German Weather Service.] *Wetterlotse*, Hamburg, No. 100:73–92, May **1956.** 5 figs. **DLC**—The work of the Marine Office is described. The Weather Service gives information, forecasts, advice and warnings not only for shipping but for agricultural and industrial operations, with a special climatic service for Hamburg. Technical climatology includes room climate and its effects on health and production, statistical studies and long-period frequencies of injurious weather. The Maritime Meteorological Service deals with the collection, evaluating and charting of ships' observations (a world map of mean air temperature in Feb. 1956 is included). The Overseas Climatology Section advises exporters and issues a monthly report of overseas weather. The Library contains 69,000 volumes increasing by 1600 a year. A list of publications is given. *Subject Headings:* **1. Meteorological services 2. German Meteorological Service Marine Office.**—*C.E.P.B.*

7.11–48 551.57:061.1:608(47)

Ogir', I. P., **Opyt raboty Komissii po izobretatel'stvu i ratsionalizatsii UGMS Dal'nego Vostoka.** [Work of the Commission for Invention and Rationalization of the Far East Hydrometeorological Service.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:43, July/Aug. **1955. DWB**—It is pointed out that the publication of information bulletins stressing the importance of invention and rationalization and setting forth the requirements of the Committee on Inventions and Rationalization, the rewards for suggestions and inventions, etc., aroused interest and led to the submission of various proposals by the technical staffs of the Far East Hydrometeorological Service. *Subject Headings:* **1. Hydrometeorological services 2. Inventions 3. U.S.S.R.**—*I.L.D.*

7.11–49 551.5:061.1(431)

Lehman, Robert, **Aufgaben und Arbeitsweise der Wetterwarte Koblenz.** [Duties and working schedule of the Koblenz weather station.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:19–23, Feb. **1955.** fig. **DWB**—The operations of the weather station are discussed. They are governed by the requirements of its regular (mostly industrial and agricultural) subscribers and seasonal (summer and winter) customers. The Koblenz station issues daily a series of weather reports and forecasts, frost warnings, road condition reports, wind, storm and severe weather notices and reports of weather development. Long and medium range forecasts are not made at the station but are relayed (with some modifications) to the public; but short range forecasts have to be made on the spot. All this must be done by the station meteorologist while performing his other duties, otherwise the station could only relay forecasts issued by the Neustadt Center. *Subject Headings:* **1. Meteorological services 2. Koblenz, Germany.**—*A.M.P.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION AND HISTORY

See also: **Hist. of forest met.** (Krečmer), 7.11–84.

7.11–50 551.5

Gordon, Eva L., **The schoolroom science center.** *Cornell Rural School Leaflet*, Ith... 49(1), Fall **1955.** 63 p. figs. (incl. photos), 3 tables, bibliog. p. 60–61. **DWB**—On p. 4... of this guide book for grade school science projects, is a description of a weather calendar ... how to keep it. The younger children may just record wind—later weather, temperat... cloud cover and wind direction, and combinations of these elements. Perhaps even ba... metric pressure can be recorded. Simple correlations are also possible, and examples ... shown of wind and sky, temperature and sky, pressure and sky. *Subject Headings:* **1. Teach... of meteorology 2. Elementary meteorology.**—*M.R.*

7.11–51 551.5:016(...

†Fujiwhara, Sakuhei, **Nihon Kisho-Gaku-Shi.** [History of Japanese meteorolog... Tokyo, Iwanami Book Co., Ltd., **1951.** 177 p. figs. **DLC**—After the death of Dr. F... WHARA, some of his friends arranged, edited and published his manuscripts. These wo... range from the middle ages up to the middle of the 19th century. *Subject Headings:* **1. Hist... of meteorology 2. Collected works 3. Bibliography of Sakuhei Fujiwhara.**—*H. Arakawa.*

7.11–52 551.506:902(261,7) 551.594...

Kalm, Pehr, **Meteorological observations in North America.** Translated and edited ... Esther Louise Larsen. Comments by Paul H. Oehser. *Washington Academy of Scienc... Journal*, 45(9):269–275, Sept. **1955.** 2 foot-refs. **DLC**—PEHR KALM, a Swedish student ... LINNAEUS, spent 2½ years in North America and published his journal **En Resa till Nor... America** in 3 vols. (Stockholm 1753–61). Notes from the journal are quoted extensive... Keen and detailed observations of the aurora are compared with observations made in Swed... during the same period and it was found that whenever auroras were strong in North Ameri... they were strong in Sweden, but not vice versa. The author also took numerous observatio... of air and water temperature on his two crossings of the Atlantic and in wells and strean... He noted the fact that water temperature was sometimes higher and sometimes lower th... the air temperature. Readings were made of water taken from the sea surface by means ... a bucket. Celsius scale was used in all readings. *Subject Headings:* **1. Auroral observatio... 2. Historical weather records 3. Sea-air temperature observations. I. Larsen, Esth... Louise** (*trans.*) **II. Oehser, Paul H.**—*M.R.*

BIOGRAPHY

7.11–53 91:9...

Beck, Hanno, **Heinrich Berghaus und Alexander von Humboldt.** *Petermanns Ge... graphische Mitteilungen*, Gotha, 100(1):4–16, **1956.** 2 photos, 48 refs. **DLC**—BERGHAUS (1797–1884) and HUMBOLDT (1769–1859) were geographers who worked together from 181... to 1859. A biography of BERGHAUS is given and his geographical work described; the li... of his publications includes very little meteorology. *Subject Headings:* **1. Biography 2. Berg... haus, Heinrich 3. Humboldt, Alexander von.**—*C.E.P.B.*

7.11–54 91:55:9...

White, George W., **Lewis Evans, 1700–1756, a scientist in colonial America.** *Natur... London*, 177(4519):1055–1056, June 9, **1956.** 7 refs. **DWB**—This account of LEWIS EVANS ... born in Wales, but from 1736 a surveyor and map maker in Philadelphia, is mainly concerne... with his geological and surveying activities in America, but mentions his "valuable observation... on plants, animals and meteorology." He correctly interpreted the raised beaches of th... Pleistocene Lake Ontario, and the isostatic effect of draining. *Subject Headings:* **1. Biograph... 2. Evans, Lewis.**—*C.E.P.B.*

7.11–55 551.5:92

Thomson, Andrew, **Obituary Notice [of] Dr. J. Patterson, O.B.E., M.A., LL.D., F.R.S.C.** *Royal Meteorological Society, Quarterly Journal*, 82(353):381–382, July **1956. DWB**—Born in Ontario, Jan. 3, 1872, and educated at University of Toronto. In 1905, Imperial Meteorologist to Government of India, later joined Meteorological Service of Canada, becoming Assistant Director in 1924 and Director (later Controller) in 1929. Made many improvements in design of wind and pressure instruments, and was closely associated with international meteorology. Died Feb. 22, 1956. *Subject Headings:* **1. Obituaries 2. Patterson, J.**—*C.E.P.B.*

7.11–56 53:92

Stratton, F. J. M., **Prof. Megh Nad Saha, F.R.S. [Obituary].** *Nature*, London, 177(4516):917, May 19, **1956. DWB**—Indian physicist who died Feb. 16, 1956, aged 62. He is known for "Saha's equation" describing effects of pressure and temperature in a gaseous mixture of neutral atoms, ions and electrons. Director of Institute of Nuclear Physics, Calcutta, and held many other important positions. *Subject Headings:* **1. Obituaries 2. Saha, M. N.**—*C.E.P.B.*

7.11–57 551.5:92

Geiger, Rudolf, **Das Leben von August Schmauss (26.11.1877–10.10.1954).** [The life of A. Schmauss.] *Annalen der Meteorologie*, Hamburg, 7(3/4):161–172, **1955/56.** 4 photos. **DWB**—This informal account of SCHMAUSS also gives a good picture of the development of official meteorology in Germany. Born and educated in Munich, he was a singer and played the violin regularly from 1903–1941. In 1904, assistant in physics to W. ROENTGEN in Munich, but was called to the Prussian Meteorological Service in 1906. In 1910 became Director of the Bavarian Landeswetterwarte (State Meteorological Service) which he did much to develop. From 1923 to his death he was President of the German Meteorological Society. In 1934 the Bavarian Weather Service was incorporated in the Reichswetterdienst, and SCHMAUSS suffered other blows, culminating in the war, but in 1945 he set about rebuilding the Bavarian Landeswetterwarte. *Subject Headings.* **1. Biography 2. Schmauss, August.**—*C.E.P.B.*

BIBLIOGRAPHY—INDEXES

See also: **Bioclimatology bibliog.** (Precht et al.), 7.11–11, **Bibliog. of Sakuhei Fujiwhara,** 7.11–51; **Recent papers in J. Optical Soc. Am.** (Hulburt), 7.11–295.

7.11–58 551.5:63:016

†Germany. Deutscher Wetterdienst, **Agrarmeteorologische Bibliographie, 1951, 1952.** [Agricultural Meteorology Bibliography, 1951, 1952]. Comp. by Max Schneider. Its *Bibliographien*, No. 3 and No. 4, pub. **1955, 1956.** 96 p. 861+946 refs. **DWB**—These annotated bibliographies on agricultural meteorology are a continuation of their agricultural meteorological bibliographies (for 1950 issue, *see* 6.11–50, Nov. 1955, *MAB*) and contain all pertinent literature available to the German Meteorological Service in the U. S. Zone between Jan. 1 and Dec. 31, 1952. The literature cited covers all that is directly and indirectly concerned with agricultural meteorology including plant and animal physiology and pathology, agronomy, agricultural geography, etc. The abstracts are classified according to subject headings with the corresponding Universal Decimal Classification numbers. A list of the subject headings and classification numbers of the periodicals and serials containing the articles cited and an author index are included. *Subject Headings:* **1. Agricultural meteorology bibliographies 2. Bibliographies. I. Schneider, Max** (*ed.*).—*I.L.D.*

7.11–59 551.506(73):902:016

†Havens, James M., **Annotated bibliography of meteorological observations in the United States, 1731–1818.** Florida. State Univ. Dept. of Meteorology, Project NR-082-071, Contract NONR-1600(00), Technical Report, No. 5, March 1, **1955.** 31 p. 2 figs., 22 refs. **DWB**—A survey of existing manuscript and published meteorological records for 1731–1818 was made by sending >300 letters to libraries, museums, etc. in the eastern U. S. Only records of temperature, pressure, precipitation or remarks on wind and weather were considered

if made daily (and with at least one of the elements recorded from instrumental observat... A chart shows by means of horizontal bars the duration of record of each of the 80 re... analyzed and cited. Records are listed by states, towns, observers, period, elements rec... and location of record. The state of preservation of the records is commented on, an... fact that the present status of cataloging and storage is unsatisfactory in many instan... emphasized. *Subject Headings:* **1. Historic weather records 2. Bibliography of histo... records 3. United States.**—*M.R.*

7.11–60 551.594.7:01...

†Institute of Radio Engineers, N. Y., **Proceedings, Vol. 43, No. 11, Pt. 2, Nov. 1955, I... to abstracts and references 1946–1953.** 189 p. Author Index and Subject Index for ... year, and List of Journals for years 1948–1953. **DLC**—Eight separate author index... subject indexes and 6 journal indexes for the respective years are bound together in an e... lently printed, 3 column to the page publication which, unfortunately, is almost ille... without a magnifying glass. The author indexes contain abbreviated titles and referen... abstracts. Subjects under which abstracts of interest to meteorologists may be found, inc... absorption; anemometer, hot wire; atmosphere; troposphere; ionosphere; microwaves; ra... wave propagation; meteorology, atmospherics; aurora; cosmic radiation; meteors; ... magnetic storms; geomagnetism; astronomy and radio; refractive index, etc. *Subject H... ings:* **1. Abstract indexes 2. Radio wave propagation abstracts.**—*M.R.*

7.11–61 016(99,269) 016:551.5(99,...

†Kosack, Hans-Peter, **Bibliografía antártica.** [Antarctic bibliography.] *Revista ... gráfica de Chile "Terra Australia,"* Santiago de Chile, No. 13:125–133, May **1955.** Also... Cléricus, Pablo, **Otros libros y publicaciones sobre la Antártica.** *Ibid.*, p. 133–137. **DW...** Numerous references with brief annotations are given to literature on the Antarctic, ... classified under 20 or 30 headings, of which General, Expeditions (chronologically arrang... Oceanography, Glaciology, Meteorology, Terrestrial Magnetism and Ionosphere are of spe... interest. *Subject Headings:* **1. Antarctic bibliographies 2. Antarctica.**—*M.R.*

APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Met. for mariners** (Höhn), 7.11–8; **Marine Office of German Weather Service,** 7.11–47; **Oceanic fronts** (Cromwell, Reid), 7.11–206; **Phytoplankton and hydrography, Antarctic Ocean** (Hasle), 7.11–207; **Height of wind sea** (Walden), 7.11–228; **Sea level rise, S. Carolina coast** (De Veaux), 7.11–229.

7.11–62 551.465(263...

Austin, George B., Jr. (*Dept. of Oceanography, Texas A. and M. College*), **Some rece... oceanographic surveys of the Gulf of Mexico.** *American Geophysical Union, Transactio...* 36(5):885–892, Oct. **1955.** 11 figs. **DWB, DLC**—An apparently semi-permanent, lar... scale, anti-cyclonic eddy repeatedly observed on four earlier oceanographic surveys w... investigated in greater detail during Cruise 54-10 of the "A. A. Jakkula," Aug.–Sept., 19... Evidence from the five surveys made in the region of the eddy indicates that the eddy is ... integral part of the Gulf Stream system in the Gulf of Mexico. From the single ship surv... of Cruise 54-10 an attempt was made (1) to locate and define the eddy and (2) to establi... whether or not it was a temporary or permanent feature of the Gulf of Mexico and the Yucata... Current or to determine whether or not it changed physically in space and time or bot... *Subject Headings:* **1. Ocean currents 2. Gulf Stream eddies 3. Gulf of Mexico.**—*Author abstract.*

7.11–63 551.526...

Arthur, Robert S., **Oscillations in sea temperature at Scripps and Oceanside pier...** *Deep-Sea Research*, London, 2(2):107–121, Jan. **1955.** 8 figs., 15 refs. **DWB**—Observatio...

sea temperature have been made in the vicinity of two southern California coastal piers me 40 km apart. Temperature-depth curves and temperature profiles show a shallow ermocline during the warm months. The depth of the thermocline varies with time, and, a result, thermograms from fixed depths at the pier ends show oscillations. Changes of 5°C er a time interval of hours are frequent as the intersection of the thermocline with the sloping ottom moves inshore and offshore. Thermograms from the two piers show no obvious oherence in the oscillations, but over a distance of 4 km along the Scripps shore there is idence of coherence. Oscillations in the thermograms suggest the possibility of tidal riodicities but without the persistent regularity demonstrated for surface tides. An internal ave mechanism is consistent with the data. Internal waves have been confirmed in deeper ater in the general area, and the oscillations can, therefore, represent the effect near the shore internal waves of various periods, including tidal. Applications to marine biology, under- ater sound, and sedimentation are mentioned. It is suggested that coastal piers offer bases r economical operation of gages which will help to determine the existence and nature of ternal-tide waves. *Subject Headings:* **1. Sea temperatures 2. Southern California Coast.** *-Author's abstract.*

7.11–64 551.526.6:525.6

Leipper, Dale F. (*Texas A. and M. College*), **Sea temperature variations associated with dal currents in stratified shallow water over an irregular bottom.** *Journal of Marine Re- arch*, New Haven, Conn., 14(3):234–252, **1955.** 7 figs., 2 tables, 7 refs., 3 eqs. **DWB, LC**—Unusual features of the large and nearly periodic variations in sea temperature which e observed in shallow stratified water along the coast of southern California may be caused y tidal stirring over an irregular bottom and by subsequent horizontal and vertical oscillating ovements associated with tides. *Subject Headings:* **1. Sea temperature variations 2. Tidal ffects 3. Southern California Coast.**—*Author's abstract.*

7.11–65 551.526.6(453.33)

*Picotti, Mario, **La temperatura del mare a Trieste durante il periodo 1948–1954.** [Sea mperature at Trieste, 1948–1954.] *Trieste. Istituto Sperimentale Talassografico, Pub- icazioni*, No. 317, **1955.** 7 p. 4 tables. **DWB**—This report is reprinted from p. 59–65 of *ubblicazioni*, No. 316, **1955.** It gives details of sea temperature observations in Adriatic egion (Trieste, Istria, Moletto and at sea) since 1841, and mean decadal sea temperature at rieste for 3 times each month 1948–1954 inclusive, and mean monthly air temperature for 841–1940, 1934–1943, 1948–1950, 1951–54 and 1948–54 at Trieste. Sea temperature data r 1948–50 and 1951–4 are compared with normal and those for other periods (though non- omogeneous). *Subject Headings:* **1. Sea temperature data 2. Adriatic Region 3. Trieste.** *-M.R.*

7.11–66 551.526.6:551.556:551.46

Lumby, J. R., **The depth of the wind-produced homogeneous layer in the oceans.** *Great ritain. Ministry of Agriculture. Fisheries and Food, Fishery Investigations*, Ser. 2, 20(2), **955.** 12 p. 9 figs., 2 tables, 6 refs. **GB-MO.** Also in: *I.U.G.G. Association of Physical ceanography, Rome, Sept. 14–25, 1954, Procès-Verbaux.* Bergen, **1954.** p. 282–293. ref., q.—The depth of the homogeneous layer due to wind is computed by MONTGOMERY's formula r oceans between 60°N and 60°S, using 3rd quartiles of wind force frequencies observed by ips, and sea temperatures down to 400 m. The results are shown in 4 quarterly charts. he computed values agree broadly with those derived from temperatures and salinities in the orthern North Sea and eastern N. Atlantic. Evidence is found that mean temperature at 00 m in 50–52°N 10–14°W has risen by up to 0.8°C since 1927. *Subject Headings:* **1. Wind ffects on water surfaces 2. Sea temperatures.**—*C.E.P.B.*

7.11–67 551.556:532.593

Walden, Hans, **Ein neues Diagramm zur Berechnung des Seegangs aus den Wind- erhältnissen.** [A new diagram for calculating the sea disturbance from the wind conditions.]

Annalen der Meteorologie, Hamburg, 7(3/4):213–218, **1955/56.** 4 figs., 4 refs. Germa... English summaries p. 213. **DWB**—From recent Atlantic data diagrams are constr... showing: a) wind wave height H and energy (2.83 H^2) in terms of mean apparent per... waves, wind velocity (kn), duration (hrs) and fetch (naut. mi), and 2) height and ener... swell in terms of shortest and longest period, wind velocity and duration. *Subject Hea...* **1. Wind waves 2. Ocean wave heights.**—*C.E.P.B.*

GLACIOLOGY

See also: **Glacier fluctuations in N. Atlantic area** (Sweeting), 7.11–273; **Glacial period and Atlantida** (Khagemeïster), 7.11–276.

7.11–68 551.311.12:5...

Röthlisberger, H., **Studies in glacier physics on the Penny Ice Cap, Baffin Island, ... Pt. 3, Seismic soundings.** *Journal of Glaciology*, 2(18):539–552, Oct. **1955.** 12 figs., 12 ... 12 eqs. English and German summaries p. 539. **DWB**—Seismic refraction and refle... measurements gave the thickness of the highland firn and ice as 254 m. A profile of Hig... Glacier was constructed. *Subject Headings:* **1. Glacier thickness 2. Seismic soun... 3. Baffin Island.**—*C.E.P.B.*

7.11–69 551.3...

Ward, W. H., **Studies in glacier physics on the Penny Ice Cap, Baffin Island, 1953, I... The flow of Highway Glacier.** *Journal of Glaciology*, 2(18):592–598, Oct. **1955.** 3 ... 3 tables, 7 refs. English and French summaries p. 592. **DWB**—The average horize... speed below the lowest tributary glacier is 56 m/yr. Most of this arises from the gl... sliding on its bed. The mean shear stress on the bed is practically constant at about 0.9 ... but it is much smaller beneath the retreating tongue. The annual volume of ice los... ablation (2.22 m and 1.06 m at 440 and 750 m) is about 20×10^6 m^3. The annual disch... cannot exceed 17×10^6 m^3. This indicates that the glacier is retreating. *Subject Head...* **1. Glaciers 2. Baffin Island.**—*C.E.P.B.*

AERONAUTICAL METEOROLOGY

See also: **Flight investigation on clear air turbulence** (Allan), 7.11–213; **Aircraft lightning** (Stark), 7.11–302.

7.11–70 551.551:551.557:62...

Heath-Smith, J. R., **Turbulence encountered by Comet 1 aircraft.** *Farnborough. E... land. Royal Aircraft Establishment, Report Structures*, 179, May **1955.** 26 p. 6 pla... 12 tables, 3 refs. Mimeo. **GB-MO** On 680,000 mi flying in Comet Aircraft on rou... London to S. Africa, Ceylon and Tokyo via India a counting accelerometer, air speed indica... and clock were photographed at 10 min intervals. Data are given in full and summarized ... tables and graphs. A method of translating acceleration into vertical gust speed is describ... Turbulence decreases with increasing altitude; figures of miles per gust show that 91% ... gusts >10 ft/sec were met below 27,500 ft, and of those above this height 75% were in cumul... Data for vertical gusts >20 and 30 ft/sec show a similar distribution. The average horizon... extent of gusty conditions was 65 mi. *Subject Headings:* **1. High level turbulence 2. Airpla... observations.**—*C.E.P.B.*

7.11–71 551.58:656...

*Guss, Hans and Regula, Herbert, **Die flugklimatologischen Verhältnisse deutsc... Verkehrflughäfen.** [Aeroclimatic conditions of German commercial airports.] *Germa... Deutscher Wetterdienst, Berichte*, 3(21), **1956.** 12 p. fig., 5 tables, 7 refs. **DWB**—For ... air bases in Germany, detailed statistics considered essential for aviation purposes, based ... hourly observations for 1949–54, are presented. Tables contain monthly maximum a... minimum station and sea level pressure; mean temperature and standard deviation at ea...

our, as well as mean and absolute daily extremes; mean 3-hourly relative humidity (and for erlin and Nürnberg, minima and standard deviation); frequency of visibility <1 mi, of iling <500 ft at selected hours; number of hours per month with critical and below minima ight conditions (ceiling and visibility 500 ft/1 mi, 200 ft/½ mi, respectively). The graphical aterial includes hourly frequencies of these conditions, with duration data, and wind roses r mid-season months. Parameters of basic importance for take-off and height determination emperature, density, pressure) are briefly discussed and representative values given for elected stations. *Subject Headings:* **1. Airport climatology 2. Germany.**—*R. S. Quiroz.*

7.11–72 551.509.58:656.71

Phillpot, H. R. and Stevenson, J. W. (*both, Central Met. Bureau, Melbourne*), **An objective method of forecasting sub-minimum weather conditions at Cambridge Aerodrome, Tasmania.** *Australian Meteorological Magazine*, Melbourne, No. 8:21–32, March **1955.** 4 figs., 9 tables, refs. **DWB**—A study has been made of weather conditions at Cambridge Aerodrome, Tasmania, to provide forecasting officers with an aid whereby they may more easily assess whether terminal conditions will be satisfactory, warning or minimum according to the classification of the Dept. of Civil Aviation. The technique as developed requires, as a preliminary step, forecasting the geostrophic wind speed and direction as well as the dry bulb temperature and dew point, after which the degree of risk can be assessed at nil, slight, moderate or high by using diagrams provided. Slight risk is considered to be an approximate 15% chance of experiencing conditions which are not completely satisfactory, for moderate risk this chance is about 55% and for high risk 95%. The diagrams have been prepared empirically but have been tested against an independent set of data with satisfactory results. *Subject Headings:* **1. Airport terminal forecasts 2. Cambridge Aerodrome, Tasmania.**—*Authors' abstract.*

7.11–73 551.509.58:656.7(261)

*O'Carroll, F. M., **Investigation into the accuracy of wind forecasts prepared at Shannon Airport for the Great-Circle Route, Shannon-Gander.** *Eire. Meteorological Service, Technical Note*, No. 20, Dec. **1955.** 23 p. 4 figs., 7 tables, 7 refs., eqs. **DWB** The differences between forecast 700 mb. and 500 mb. wind components on the Great-Circle route from Shannon to Gander and the subsequently estimated actual values of these components have been recorded over a two-year period, and the distribution of these differences is tabulated. It is found that approximately 92% of all such forecasts were within 12 knots of the corresponding actuals and about 73% were within 7 knots. The differences in general are found to have an approximately symmetrical distribution about a mean value close to zero, but the distribution is shown to be different from a simple normal distribution. A compound normal distribution is fitted to the observed values and by this means diagrams are prepared showing the expected percentage of forecasts having a given degree of accuracy. The effect on the accuracy of the forecasts of a lack of recent actual upper-air charts is also investigated. It is found that during the winter half of the year, forecasts prepared immediately after the analysis of new upper-air charts are appreciably more accurate than those prepared at other times of the day. *Subject Headings:* **1. Upper air wind forecast accuracy 2. Forecast verification 3. Shannon-Gander air route.**—*Author's abstract.*

7.11–74 551.509.5:551.591.3

*Johnson, Melvin Arnold; Martin, Delance (both, *U. S. W. B., Cincinnati*), and Fortner, Limon E., Jr., **Restricted morning visibilities due to nocturnal radiation at Wright-Patterson Air Force Base, Ohio.** Wright-Patterson Air Force Base, Ohio, [1955?] 9 p. 3 graphs. **DWB**—Preliminary study of restrictions to visibility in morning hours for May to Sept. 1949 through 1952, with 1953 and 1954 data used for a check. Three classes (A, B and C, one with <1 mi, one with 1–3 mi and one for >3 and <7 mi at 073 Δh respectively) were used. Parameters tested were maximum temperature, 1930 h temperature, dew point, and surface wind. Graphs show areas of relative correlation and tables show frequency of agreement between classes. Order of preparation of forecast from charts is set forth in text, with examples. *Subject Headings:* **1. Visibility forecasting 2. Nocturnal radiation 3. Wright-Patterson Air Base, Ohio.**—*M.R.*

7.11–75 551.509.5:551.591:6

Maher, J. V. (*Central Met. Bureau, Melbourne*), **Preliminary report on an objective m... of forecasting minimum conditions at Leigh Creek, South Australia.** *Australian Meteorol... Magazine*, Melbourne, No. 9:55–60, June 1955. 4 figs. **DWB**—The author consider... meteorological aspects of terminal forecasting of the probability of visibility and cloud c... tions falling below the minimum acceptable for aircraft landings at Leigh Creek wher... controlled burning of tailings at adjacent coal dumps are a variable factor. Pilot ba... observations at Woomera where similar conditions prevail is used to develop the foreca... method—which employs as parameters the 3000 ft wind direction and speed observe... 1600Z and the surface temperature and dew point at 1700Z for determining cloud and visi... conditions at 2300Z. *Subject Headings:* **1. Terminal forecasts 2. Objective foreca... method 3. Visibility 4. Leigh Creek, South Australia.**—*I.L.D.*

AGRICULTURAL METEOROLOGY

See also: **Agromet. bibliog., 7.11–58.**

7.11–76 551.5:632.9:3...

Beall, J. M., **Crop dusting.** *U. S. Weather Bureau, Weekly Weather and Crop Bull...* 43(4):8, Jan. 23, 1956. **DWB**—Farmers in the U. S. employ 7,000 aircraft (including ... copters) to protect crops from pests, to kill weeds and to fertilize crops. One unusual ... of a helicopter was to blow the raindrops off of the cherries in the Santa Clara Valley be... the sun could come out and split the ripe fruit. It was estimated that a saving of $37... was made on 200 acres of orchard compared to Alameda County orchards unprotected ... loss compared with 20% loss). Cost of helicopter was $4 per acre and saving $1,500/a... Problems arising from aerial spraying and role of U. S. W. B. forecasts of wind, dew, turbule... etc. are discussed briefly. *Subject Headings:* **1. Agricultural aviation 2. Helicopter fl... protection 3. Crop dusting 4. Santa Clara Valley, Calif.**—*M.R.*

7.11–77 551.5:63 551.58...

Kulin, István, **A hazai agrometeorológiai kutatás időszerű kérdései.** [Current proble... in agrometeorological research in Hungary.] *Időjárás*, Budapest, 59(2):107–109, Mar... April **1955. DWB**—Current and future projects in agricultural meteorology in Hungary ... outlined; they comprise: 1) education; 2) planning and coordinating research activities a... instrumentation; 3) analysis of general climatic data with a view to the needs of agricultu... 4) cooperation with agricultural research scientists and 5) research program of the Mart... vásár Microclimatological Research Station: (a) microclimatological surveys, (b) investigat... of the effect of various methods of cultivation on the heat and moisture balance of the s... (c) micrometeorological investigation of various crops, and growing methods. *Subj... Headings:* **1. Agrometeorological research 2. Agricultural meteorology 3. Agricultu... climatology 4. Microclimatology 5. Hungary.**—*G.T.*

7.11–78 551.509.62:634...

Tsuboi, Y.; Honda, I.; Hatagoshi, K. and Yamato, M. (*Nat. Inst. of Agri. Sci.*), ... **experiments of protection against frost damage by oil-burning in vineyard.** *Journal of Ag... cultural Meteorology*, Tokyo, 10(3/4):109–112, March 1955. 4 figs., table, 2 refs. In Japanes... English summary p. 112. **DWB**—In order to get an effective and economical burning metho... especially that of a spacing of oil-burners in a vineyard, horizontal and vertical distributio... of air temperature in the experimental field before and after lighting were investigated. T... experiments were carried out at Kikyōgahara in Nagano Prefecture on May 19–23, 195... The results showed a good, uniform distribution of the warm zone, with the temperature ri... of 1.5° to 2°C in the whole experimental field and of 3°C in the middle, when small tins (14 c... in diameter) were hung at the height of 90 cm under the trellis and were spaced in such mann... that there is about one heater in every 4 sq m. *Subject Headings:* **1. Frost protection 2. Vin... yards 3. Nagano Prefecture, Japan.**—*Authors' abstract.*

7.11–79 551.579.5:63

Uhlig, Siegfried, **Untersuchungsobjekt Bodenfeuchte.** [Soil humidity as an object of investigation.] *Umschau*, Frankfurt a.M., 56(14):434–437, July 15, 1956. 8 figs. DLC—The German Agrometeorological Service has been investigating soil moisture to a depth of 1m since 1948, using a special borer; electrical methods are also being developed. The program includes twice-weekly observations through the year, under crops and bare soil, together with soil temperatures, etc. Examples of profiles (May–Aug.) under late potatoes and winter rye on loess in Geisenheim show effect of rain. Various other curves of moisture content are given. The bearing of the investigations on improvement of cultivation is discussed. *Subject Headings:* **1. Soil moisture 2. Agricultural meteorology.**—*C.E.P.B.*

7.11–80 551.58:633.73

Schröder, Rudolf, **Die klimatischen Bedingungen für den Kaffeeanbau auf der Erde, insbesondere in Zentral- und Südamerika.** [Climatic conditions for coffee culture on the earth, especially in Central and South America.] *Petermanns Geographische Mitteilungen*, 100(2):122–136, 1956. 2 charts, 4 figs., 36 refs. DLC—A world map shows the limits of coffee growing and monthly rainfall and temperature at selected stations. A more detailed map of Central and S. America shows also percentage of rain in each month and the harvest season. The governing climatic conditions are incoming radiation, which practically limits it to the intertropics, air temperature, annual amount and seasonal distribution of rainfall, and wind, which makes coffee growing impossible in some otherwise suitable localities. The climates of individual areas are discussed in detail, with times of harvest. Finally, microclimates, which govern methods of planting, are examined. An important problem is the search for a strain which can withstand occasional frosts of −2 to −3°C. *Subject Headings:* **1. Agricultural climatology 2. Coffee crop.**—*C.E.P.B.*

7.11–81 551.509.5:632.9:633.491

Grainger, John, **The 'Auchincruive' potato blight forecast recorder.** *Weather*, 10(7):213–222, July 1955. 6 figs., 7 photos., 10 refs. DWB—Forecasting first appearance of potato blight brings precision to protective spraying. The meteorological criteria (temperature and humidity) of Beaumont periods are discussed and forecasting by Beaumont periods is illustrated for 1944–52. A self-calculating blight forecaster (Negretti and Zambra) is described, dry and wet traces indicating when relative humidity is above 75% and temperature above 50°F. Forecasts of blight were successful. The economics of spraying are discussed; in some regions the value of increase of yield is less than cost of spraying. *Subject Heading:* **1. Potato blight forecasting.**—*C.E.P.B.*

FOREST METEOROLOGY

7.11–82 634.94:551.577.2(495)

Beuermann, Arnold, **Die Waldverhältnisse im Peloponnes unter besonderer Berücksichtigung der Entwaldung und Aufforstung.** [Forest conditions in Peloponnesus with special regard to deforestation and afforestation.] *Erdkunde*, Bonn. 10(2):122–136, April 1956. 3 figs., 4 photos., 2 tables, 23 refs. English summary p. 122–123. DWB—The areal and vertical distribution of woodland trees is charted and related to maps of relief and mean annual rainfall (1901–40). Human agencies in conjunction with the dry climate are responsible for deforestation and soil erosion. Possibilities and difficulties of reafforestation are discussed. *Subject Headings:* **1. Forests 2. Rainfall distribution 3. Peloponnesus, Greece.**—*C.E.P.B.*

7.11–83 551.509.34:632.187(79)

Cramer, Owen P. (*Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.*), **Use of charts and graphs in interpreting forecasts.** Reproduced by U. S. Weather Bureau with permission of U. S. Forest Service, June 1953. 9 p. figs., tables, 2 refs. DWB—A study of local wind and humidity conditions, and spot wind and burning index forecasts were made for a number of points in the Washington and Oregon forests to test the usefulness of objective graphs (for morning and evening forecasts, respectively) based on departures of local conditions from regional conditions as forecast, rather than by using the persistence

method which had served the Forest Service stations in the region prior to 1949. The estim of wind based on 8 a.m. observed wind gave 64% verification for 2 seasons (the same accu as climatic average); adjusted area forecasts gave 62% and persistence 57%. Adju burning index forecasts were worse than persistence so conclusion is that at present the of graphs and charts for localizing area forecasts is not justified. *Subject Headings:* **1. Fo fire prediction 2. Local forecast studies 3. Washington 4. Oregon.**—*M.R.*

7.11–84 551.588.6

Kre˘mer, Vladim´r, **Lesnická meteorologie a klimatologie.** [Forest meteorology climatology.] *Meteorologické Zprávy*, Prague, 7(5):113–117, **1954.** 5 figs., 5 refs. Rus and German summaries p. 113. **DLC**—The history of forest climatology in Russia and Ce Europe is summed up. The various branches, methods and applications of meteorolo research in forests are reviewed. In Czechoslovakia the emphasis in forest climatology i applications to plant biology. *Subject Headings:* **1. Forest climatology 2. History of fo climatology.**—*G.T.*

7.11–85 634.

Mallik, A. K., **Fourth World Forestry Congress.** *World Meteorological Organiza WMO Bulletin*, 4(3):119–120, July **1955.** photo. **DWB**—The Fourth World Fore Congress at Dehra Dun, India, met Dec. 11–22, 1954, with delegates from 48 countries 5 international organizations attending. The author represented WMO. Discussions w held on definition of a desert, and on protective functions of forests. More study is ur on problem of forest influences on rainfall, soil and climate. *Subject Headings:* **1. Fo influences 2. World Forestry Congress 3. Dehra Dun, India.**—*M.R.*

INDUSTRIAL METEOROLOGY

See also: **Generation of wind power by electricity** (Golding), 7.11–5; **Fishery research, Barents Sea** (Lee), 7.11–208.

7.11–86 551.586:31

§Schröder, Bertold, **Unfälle und Wetter.** [Accidents and weather.] *Annalen der teorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:133–136, **1956.** Also: Kö Werner, **Hamburger Verkehrsunfälle und Wetter.** [Hamburg traffic accidents and weathe *Ibid.*, p. 137 147. 16 figs., 15 refs. Also: Cyran, W., **Betriebsunfälle und Wetter (Eig referat).** [Industrial accidents and weather (summary).] *Ibid.*, p. 148. Also: Daub Karl, **Betriebsunfälle der Bundesbahn in Württemberg und Wettergeschehen.** [Accide on the Wurttemberg Federal railroad and weather.] *Ibid.*, p. 149–151. 3 figs., 2 refs. Al Spann, W., **Diskussions-Beitrag zu "Verkehrsunfälle und Wetter."** [Discussion of "Tra accidents and weather."] *Ibid.*, p. 152. 2 figs., refs. **DWB**—Schröder opened the d cussion by describing statistical investigations in Germany which pose the question whet there is a connection between human proneness to accident and some factor such as infra-lon wave radiation. If so, can accident forecasts be issued, how and when, and what effect w they have? Köhn discussed the incidence of street accidents in Hamburg. These a mostly due to traffic congestion but accidents were most frequent on days with a rapid chan of weather, such as a change from anticyclonic to cyclonic, especially with strong cyclogenes Examples are given with synoptic charts. Statistics for 1952–1954 show that this relation statistically highly significant. Cyran stated that industrial accidents were not significant related to disturbed (cyclogenetic) days, though they tended to be most numerous in t afternoons of disturbed days. Daubert found that driving accidents in summer are mo frequent on days of high temperature and humidity (sultry days), and at all seasons with war air advances in the troposphere (especially upglide processes). In the discussion Span found that traffic accidents in Munich are most frequent with föhn over fine weather a approaching or arrived disturbances. *Subject Headings:* **1. Biometeorology 2. Accide frequency.**—*C.E.P.B.*

7.11–87 551.556.3:621.311.24

†Golding, Edward William, **Electrical energy from the wind.** *Institution of Electrical Engineers, London, Proceedings, Pt. A*, 102(6):677–695, Dec. **1955.** 12 figs., 3 tables, 22 refs. **DLC**—The history of the use of wind power is traced briefly to provide a background to the present renewal of interest in the subject. The characteristics of the wind as a source of power are discussed together with its possibilities for the generation of electrical energy. A short review of the different types of windmill is given, leading to a description of the main features of some recent designs. Wind-power research and development work in Great Britain is described with an account of the progress made during the last six years. The economy of wind power on three scales of utilization is dealt with and suggestions are made for making the most effective use of the energy available. *Subject Headings:* **1. Wind generators 2. Wind power projects.**—*Author's abstract.*

7.11–88 551.577.37:62

Wolf, P. O., **The civil engineer's interest in heavy rainfall.** *Weather*, 11(8):241–248, Aug. **1956.** 2 figs., 4 refs. **DWB**—Storage, runoff and disposal of stormwater are discussed. "Period of concentration" is defined. Over a small area the mean intensity of a "maximum storm" is inversely proportional to the square root of the duration, and is also reduced if the area of the storm increases. The principle of balancing cost of flood works against economic losses is explained. Maximum runoff figures for catchments of different areas are plotted. *Subject Headings:* **1. Excessive rainfall 2. Engineering.**—*C.E.P.B.*

MEDICAL METEOROLOGY

See also: **Med.-met. forecast** (Kuhnke), 7.11–3; **Accidents and weather** (Schröder), 7.11–86; **Thermal sensation** (Bonacina), 7.11–195; **Tropical diseases, S. America** (Brazol), 7.11–287.

7.11–89 662.2:539.1:616

Navy medical team studies fallout effects. *U. S. Office of Naval Research, Research Reviews*, Nov. **1955.** p. 1–9. photos. **DWB.** Also review entitled: **Radioactive fallout in the Marshall Islands.** *Science*, Wash., D. C., 122(3181):1178–1179, Dec. 16, **1955. DLC** – In connection with the Bikini nuclear test of March 1, 1954, 239 inhabitants of four Marshall Islands and 28 American servicemen were evacuated and placed under medical supervision. All persons affected are reported recovered from their initial injuries. *Subject Headings:* **1. Atomic explosion fallout effects 2. Bikini atom bomb tests.**—*G.T.*

7.11–90 551.508.25:576.858.9

Eschke, W., **Über die Verwendung von Bakteriophagen zur UV-Dosimetrie.** [Application of bacteriophages to UV dosimetry.] *Angewandte Meteorologie*, Berlin, 2(8):225–237, June **1956.** 11 figs., 36 refs., eqs. **DLC**—UV radiation in the B range (280–315 mμ) is an important bioclimatic element. Curves show different biological effects of different wave lengths, e.g., skin erythema about 2950 Å, vitamin D 2700–2800, bactericidal 2550, inactivation of bacteriophage 2700. Natural UV radiation begins about 2900. Author considers various UV dosimeters and then describes a new one in which a quartz sphere contains T_1 bacteriophage of Escherichia Coli of known concentration. This is inactivated by exposure to sun and sky radiation; it can be used with various filters, can be calibrated in absolute units, is cheap and has other advantages. It is mounted on the sunshine recorder. Examples of observations in sun and sky radiation are given. An appendix gives operational details. *Subject Headings:* **1. Ultraviolet dosimetry 2. Bacteriophage ultraviolet instruments.**—*C.E.P.B.*

7.11–91 551.586:616.925

Dönhardt, Axel, **Pathologie und Klinik der Poliomyelitis.** [Pathological and clinical aspects of poliomyelitis.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:94–102, **1956.** 17 figs. Also: Windorfer, Adolf, **Die Epidemiologie der Poliomyelitis.** [Epidemiology of poliomyelitis.] *Ibid.*, p. 103–110. 8 figs. Also: Martini, Rudolf, **Poliomyelitis und Wetter.** [Poliomyelitis and weather.] *Ibid.*, p. 111–117. 8 figs., 9 refs. Also:

Krey, W., **Zur Poliomyelitis-Epidemiologie letzter Jahre in Hessen (Ergänzungsbeitr... den Vorträgen von Windorfer und Martini).** [Epidemiology of poliomyelitis during ... years in Hesse (Supplement to the papers by Windorfer and Martini).] *Ibid.*, p. 118... 5 figs. Also: Wildführ, Georg, **Beobachtungen zur Wetterabhängigkeit der Poliomy...** [Observations on the dependence of poliomyelitis on weather.] *Ibid.*, p. 121–125. Donle, Wilhelm, **Diskussionsbemerkungen zu "Poliomyelitis und Wetter."** [Discr... comments on "Poliomyelitis and Weather."] *Ibid.*, p. 125–126. And: Ulrich, Karl... **Diskussionsbeitrag zu "Poliomyelitis und Wetter 1953 und 1954."** [Contributions t... discussion on "Poliomyelitis and Weather 1953 and 1954."] *Ibid.*, p. 127–130. Z... **DWB**—Dönhardt traces poliomyelitis back to ancient Egypt but in recent years it ... creasing. The virus is described, age of onset, means of spreading infection, course of di... and treatment. Windorfer traces spread of epidemics in Germany (especially in ... Europe in general and U. S., with a word about seasonal incidence and forecasting. Ma... investigated polio in Nordrhein-Westfalen in 1952 in relation to vapor pressure, temper... pressure and fronts. He finds a 16% increase 11–13 days after high vapor pressure a... increase (decrease) 1–3 days after the passage of warm (cold) fronts. Krey deals with ... in Hesse in 1948–54. The annual variation shows a maximum in Sept. He finds an inc... in trough situations but the meteorological relations are very complex. Wildführ des... investigations in Leipzig and concludes that passage of cold fronts may start epidemics ... there is no connection with warm fronts, even if rapidly followed by cold fronts, or occlu... For weather types "meridional anticyclonic" is the most favorable to beginning of infe... "mixed cyclonic" least favorable. He also finds a probable correlation between infection ... geomagnetic character figure. For onset of paralysis no relations were found. In the ... cussion Donle pointed out that the problem was very complex and Ulrich from a sum... of all cases in W. Germany in 1953–54 found a direct relation with temperature a few ... earlier but could not say if high temperature was the cause or merely associated with the ... cause. *Subject Headings:* **1. Medical meteorology 2. Poliomyelitis.**—*C.E.P.B.*

7.11–92 551.586:6...

Aichinger, F. and Müller, I. L., **Das Vielfachelektrodermatogramm und seine Abhän... keit von meteorotropen Wetterlagen.** [The multiple electrodermatogram and its depend... on meteorotropic weather situations.] *Annalen der Meteorologie, Medizin-Meteorolog... Hefte*, Hamburg, No. 11:89–93, **1956.** 7 figs., 6 refs. **DWB**—The electrodermatomet... Regelsburger (E D M), useful for testing vegetative nervous reactions, is described. M... urements were made 4 times a day for 4–6 weeks on 30–50 subjects in winter and sum... at Tübingen. The results present a very confused pattern, but departures from no... diurnal variation show considerable differences depending on the synoptic situation. *Su... Headings:* **1. Medical meteorology 2. Electrodermatograms.**—*C.E.P.B.*

7.11–93 551.586:616.9...

Cordes, H., **Über Zusammenhänge zwischen epidemischen Krankheiten und Wetter... Beispiel der Grippe.** [On connections between epidemics and weather as illustrated ... influenza.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:... 132, 1956. **DWB**—Weekly statistics of influenza in Bavaria in winters 1948/9–1952/3 s... that epidemics occur in Jan.-Feb. after a succession of days of typical winter anticycl... weather. When this is broken by cyclonic weather a sudden rise of the sickness curve occ... but predominantly cyclonic weather does not give epidemics. Epidemic pneumonia ... catarrh have the same causes. *Subject Headings:* **1. Medical meteorology 2. Influe...** —*C.E.P.B.*

7.11–94 551.586:6...

Jungmann, Horst, **Die Kreislaufanalyse als Mittel zur Beobachtung von Wetter-... Klimawirkungen auf den Menschen.** [Analysis of the circulatory system as a means ... observation of the effects of weather and climate on man.] *Annalen der Meteorologie, Medi... Meteorologische Hefte*, Hamburg, No. 11:69–74, **1956.** 4 figs. **DWB**—Circulation is measu... by mean arterial pressure/time volume. Changes are plotted during days with cold and wa... air masses, on a mountain railway from 950 to 2200 m, and in patients on the North Sea c...

H in the Alps. Sudden change of biosphere brings complex changes, but long-continued y in a new medium causes regulation which reaches a maximum after 11–19 days and then lines. *Subject Headings:* **1. Medical meteorology 2. Circulatory system.**—*C.E.P.B.*

7.11–95 551.586:612

Mücher, Hans, **Über einen experimentellen Ansatz zur Analyse wetterbedingter physiologisch-psychologischer Wechselwirkung.** [Experimental analysis of physiological-ychological interactions caused by weather.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:86–88, **1956.** 3 figs., 4 refs. **DWB**—Various clinical indicators during 6 different weather types and some examples of meteorological analysis are discussed. *Subject Heading:* **1. Medical meteorology.**—*C.E.P.B.*

7.11–96 551.524:612

Pichotka, Josef, **Das physiologische Experiment in der medizin-meteorologischen Forschung.** [The physiological experiment in medical meteorological research.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:54–68, **1956.** 21 figs., 22 refs. **DWB**—Reports a number of experiments on temperature regulation of human beings (mainly rectal temperatures) and rats in relation to oxygen absorption and air temperature. *Subject Headings:* **1. Physiological experiments 2. Temperature effects on physiology.**—*C.E.P.B.*

7.11–97 551.586:313.1:34

Reise, Hans, **Rechtliche Bedeutung von Wettereinflüssen auf Menschen.** [Legal significance of weather influences on men.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:153–157, **1956.** **DWB**—Examines the bearing of weather sensitivity from the judicial point of view. Only in 3 legal cases has medical influence of weather been advanced, but weather sensitivity is a conceivable defense in many cases such as street accidents. In civil cases it will be necessary to prove a causal connection between weather situations and human conduct. *Subject Headings:* **1. Medical meteorology 2. Accidents 3. Law.**—*C.E.P.B.*

7.11–98 551.586:61:08

Schulze, Rudolf, **Medizin-meteorologische Arbeitstagung vom 17. bis 19. März 1955 in Hamburg.** [Medical-meteorological Conference, March 17–19, 1955 in Hamburg.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:1–2, **1956.** **DWB**—The second medical-meteorological conference dealt with causal connections between processes in the biosphere and biological organisms, the influence of weather and climate on infantile paralysis, and causes of accidents. Thirty papers were read and discussed; these are abstracted separately or in groups. *Subject Headings:* **1. Medical meteorology conferences 2. Hamburg, Germany.**—*C.E.P.B.*

7.11–99 551.586:616.8

von Ekesparre, W., **Kapillarresistenzmessungen bei commotio cerebri im Vergleich zum Wettergeschehen.** [Measurements of capillary resistance in case of concussion in relation to weather.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:83–85, **1956.** 2 figs., 12 refs. **DWB**—Excitement of the Sympathicus increases, of the Parasympathicus decreases capillary resistance. Variations of the capillary resistance with 11 daily weather types are shown. High values in the morning are associated with cyclogenetic, low values with anticyclonic types. *Subject Headings:* **1. Medical meteorology 2. Concussion.**—*C.E.P.B.*

7.11–100 551.586:612.12

Zink, Otto, **Die Ketosteroiduntersuchungen, eine Methode zur Abschätzung der biologischen Wetterwirksamkeit.** [Ketosteroid investigations, a method of estimating the biological effect of weather.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:75–79, **1956.** **DWB**—Variations of C-17 ketosteroid separation are taken as an expression of kidney cortex activity. The separation increases with deep advances of mT air but no cause is known. *Subject Headings:* **1. Medical meteorology 2. Blood chemistry.**—*C.E.P.B.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Sferics techniques** (WMO), 7.11–18; **Radar weather echoes** (Gt. Brit. Naval Weather Serv.), 7.11–20; **Fluorescent-particle tracer technique** (Leighton), 7.11–21; **Surface observations** (U. S. W. B.), 7.11–24; **Durham Univ. Obs.** (Baxter), 7.11–40; **Variations in ascent velocity of radiosonde balloons** (Hering), 7.11–119; **Tornadoes** (Montgomery), 7.11–182; **Hourly temp. distribution** (Spreen), 7.11–202; **Study of ionospheric winds** (Rao, Murty), 7.11–230; **Snow generating cells** (Douglas), 7.11–258; **Electric field and radar echo in thunderstorm** (Reynolds, Brook), 7.11–300.

7.11–101 551.501:55

Ballenzweig, Emanuel M., **A critique of methods of estimating large-scale vertical mo in the atmosphere.** Woods Hole Oceanographic Institution, Contract Nonr-1721(00) 082-021), Technical Report, No. 36, Sept. **1955.** 40 p. 3 figs., 3 tables, 34 refs., 24 **DWB**—A synoptic study of the heating of cold air as it flows off the coast of North Am was initiated. It was found that an important parameter, the vertical motion, could n determined reliably by the Bellamy-Sheppard technique. It was thought that a review o various methods of estimating vertical velocity would lead to a better understanding o problem. The conclusion reached is that the calculation of vertical motion by most kinem techniques to a reliability better than ±50% borders on the impossible over the ocean only hopeful avenues are (1) the application of vorticity methods, using geostrophic vorti and (2) a crude kinematic technique founded on an empirical rule with an indetermi physical basis. *Subject Heading:* **1. Vertical wind velocity calculation.**—*Author's abstract.*

7.11–102 551.501:551

Bol'shakov, V. S., **O kolichestvennoĭ kharakteristike poryvistosti vetra.** [Quantita characteristics of gustiness.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:46, May/June 1 fig., 2 eqs. **DWB**—Wind velocity was measured on a gustiness anemobarograph trace prep at the Odessa Geophysical Observatory V. A. Marchenko. The maximum velocity is g by the equation: $V_{max}=1.2V_m+7.2$, where V_{max}—maximum velocity of gusts, and V_m—m wind velocity during entire series of observations; the dependence of frequency of obse tions on mean wind velocity is given by $p=0.23V_m^{2.28}$, where p—number of gusts per min *Subject Headings:* **1. Gustiness measurement 2. Wind velocity.**—*I.L.D.*

7.11–103 551.501:551.510

Epstein, Edward S.; Osterberg, Charles and Adel, Arthur, **A new method for the termination of the vertical distribution of ozone from a ground station.** *Journal of Met ology*, 13(4):319–334, Aug. **1956.** 12 figs., 4 tables, 20 refs., 11 eqs. **DWB**—A surface met termed ERTOR (effective radiation temperature of ozone region) is described for finding vertical distribution of ozone by UV determination of total, and absorption and radiatio infrared. The theory is discussed in detail, including the assumed stratification of the mosphere. The technique of applying it is set out with examples. Isopleths of ozone densi 0 45 km over Flagstaff, Ariz., Feb. 1–Aug. 25, 1955, are plotted. Mean values of cente gravity and monthly mean distributions show a marked seasonal change (mean height F 20 km, Aug., 27 km; amount greatest in April–May). The center of gravity descends du passage of upper troughs. There is a marked tendency for large density of ozone near surface to be associated with low surface pressures and frontal passages. *Subject Head* **1. Vertical ozone distribution measurement.**—*C.E.P.B.*

7.11–104 551.501.4:551.

Felméry, László, **Kisérlet természetes felszinek párolgásának mehatározására.** attempt to determine evaporation from natural surfaces.] *Időjárás*, Budapest, 59(2):86– March/April **1955.** tables, 12 refs., eqs. Russian and French summaries p. 86. **DW** Current methods of determining evaporation amount are discussed; results obtained by s methods at the microclimatological station Erdöhátpuszta are reported. The method belie to be most accurate (Thornthwaite-Holzman method) is applied to the investigation of evap

n from soils under different forms of cultivation. *Subject Headings:* **1. Evaporation calcula-**
ns 2. Thornthwaite-Holzman method 3. Evaporation from soil.—*Trans. of author's*
tract.

7.11–105 551.501.4:551.55(26) 551.508.59(26)

Lebedev, N. A., **K voprosu opredeleniia napravleniia i skorosti vetra na khody korablia pomoshchi vetrocheta (kruga SMO).** [Determination of the wind direction and speed on moving vessel by means of the wind computer Circle SMO.] *Meteorologiia i Gidrologiia*, oscow, No. 3:48, May/June **1955.** fig. **DWB**—The wind computer consists of a circle ached to a handle, a grid subdivided in degrees and a pointer. The procedure for deter- ining the apparent wind direction from a moving vessel is described and an example is sented. *Subject Heading:* **1. Wind computation at sea.**—*I.L.D.*

7.11–106 551.501.4:551.521.12

Lopukhin, E. A., **K voprosu meteodiki aktinometricheskikh nabliudenii i ikh obrabotki.** Methods and processing of actinometric observations.] *Meteorologiia i Gidrologiia*, Moscow, o. 3:47–48, May/June **1955.** 2 refs., eq. **DWB**—The registration of total solar radiation d diffuse radiation at Tashkent over the period 1950–1953 was examined and it was found at the seasonal flux of total radiation varied as much as 9%, being less during summer oud free period) than in other seasons; also a comparison of the daily totals of diffuse and ect radiation with the total radiation for cloud free and partly cloudy days shows that on e latter days direct radiation was recorded less accurately than diffuse and total radiation. eliminate such errors the author outlines a series of procedures and presents a correction mula. *Subject Headings:* **1. Solar radiation calculations 2. Solar radiation variations.** *I.L.D.*

7.11–107 551.501.4:551.525.2

Schmidt, M., **Über die Berechnung von Tagesmitteltemperaturen der oberen Bodenschichten.** [On the calculation of daily mean temperatures of the upper soil layers.] *Zeitschrift für Meteorologie*, 10(2):52–56, Feb. **1956.** 2 figs., 4 tables, 7 refs. **DLC**—Hourly soil mperatures in April–Nov. at Quedlinburg 5 cm under bare soil were compared with com- nations of hours recommended by various authorities. Best was (1+7+13+19)/4 (mean ror −0.02°C) but (7+14+2×21)/4 was almost as good (+0.07). The relative frequency minima (4–9 h) and maxima (13–16 h) is tabulated. The minimum follows sunrise by 0–60 min; maxima are generally at 14 or 15 h. *Subject Headings:* **1. Soil temperature com-tation 2. Quedlinburg, Germany.**—*C.E.P.B.*

7.11–108 551.501.4

Schumann, T. E. W., **The spectral analysis of a meteorological or other time series.** *outh Africa. Weather Bureau, Notos*, 4(1):4–10, **1955.** 2 figs., 4 tables, 3 refs., 38 eqs. **WB**—A simple derivation is presented of the Wiener-Khinchin theorem, which states that e auto-correlation and spectral curves of a time-series are Fourier transforms of each other. rthermore, a method is described for the determination of the spectral curve of a time- ries and illustrated by a numerical example. By means of the said theorem it ought to be ssible to derive the spectral from the auto-correlation curve, or vice versa, but in practice appears that the theorem is only of limited application, and the observed discrepancy calls r further investigation of the problem. *Subject Headings:* **1. Methods of computation Time series.**—*Author's abstract.*

7.11–109 551.501.81:551.576:551.577

Miles, V. G., **Interpretation of the height-versus-time presentation of radar echoes.** *ournal of Meteorology*, 13(4):362–368, Aug. **1956.** 7 figs., 8 refs., eqs. **DWB** -Records of ertical-beam radar cloud and precipitation echoes on 1.25 and 0.86 cm are discussed with xamples. Echoes from nonprecipitating clouds show the upper wind patterns. Echoes from owers often have a marked slope due to effect of wind on falling precipitation. If the speed the precipitation column is known the time slope can be converted into a space slope, but he interpretation is complex, depending on wind shear, fall speed, horizontal structure and

dimensions. *Subject Headings:* **1. Radar echoes from clouds 2. Radar precipitation ec** —*C.E.P.B.*

7.11–110 551.501.81:551.5

Wexler, R.; and Atlas, D. and Mason, B. J., **Factors influencing radar-echo inten in the melting layer.** Reply by B. J. Mason. *Royal Meteorological Society, Quarterly Jou* 82(353):349–351, July **1956.** table, 9 refs., 5 eqs. **DWB**—Wexler and Atlas, refe to Mason's explanation (*R.M.S., Q.J.*, 81(348):262–264, April 1955; *see* 6G–213, July *MAB*) that the large echo from melting snowflakes is due to aggregation, suggest that gr of the particles in an updraft may be important. Mason's inference that melting par are horizontal oblate spheroids is not consistent with radar observations at low altit Approximate equations for interpretation of the melting layer are given and evalu Mason agrees that his equation should be multiplied by a growth factor but thinks th small. He questions the argument about orientation of spheroids. *Subject Heading:* **1. R precipitation echoes.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Antarctic pack ice** (Herdman), 7.11–39; **Met. observations** (Kalm), 7.11–52; **Met. observations** (Havens), 7.11–59.

7.11–111 551.506.1(

*Malaya. Meteorological Service, **Summary of observations, 1954.** Singapore, 1 123 p. almost entirely tables. **DWB**—Summaries for 17 first order stations in the Federa of Malaya, Singapore, Sarawak, North Borneo and a number of auxiliary stations are presen The equipment and hours of observations are listed. A general description of the climat Malaya is presented. The climatic data given for some stations in addition to mean va of air temperature, relative humidity and precipitation, also hourly values of these variat For some stations both dry and wet bulb temperatures and vapor pressure are given. *Sub Headings:* **1. Annual meteorological data summaries 2. Climatic data 3. Climate of Mal 4. Malaya 5. Singapore 6. Sarawak 7. North Borneo.**—*I.L.D.*

7.11–112 551.506.1(6

*Seychelles. Meteorological Service, **Meteorological Observations, 1909–.** Latest iss **1949.** (No record available 1947.) Excerpted from Annual Report of the Colonial Gove ment. "Observations first published 1891." 1940– issued as a section in **East Africa H Commission. Meteorological Dept., Meteorological Observations in Kenya. DWB** (Broke **GB-Sci. Museum, MH-BH**—Monthly and annual mean pressure, temperature, cloud, ra weather and wind direction frequencies, data for Victoria Mahé-, Seychelles (4°37′S, 55°2 16 ft elevation) in standard table with brief summary. *Subject Headings:* **1. Annual meteo logical data summaries 2. Climatic data 3. Seychelles.**—*M.R.*

7.11–113 551.506.1(9

*South Georgia. [Meteorological Service], **Meteorological observations taken at Cumb land Bay, S. Georgia, 1905–.** Observations first published 1905 (see **Blue Books**). Excerp from **Annual Reports of the Colonial Government.** For **Observations,** 1951– see **Falkla Islands. Meteorological Service, Annual Meteorological Tables. DWB** (Broken), **G Sci. Museum, MH-BH**—[Abstract of 1947 issue.] A one page standard table of month and annual mean, high and low pressure, temperature, rainfall, and the number of days w sunshine, rain, snow, drizzle, sleet, fog and frost, the mean vapor pressure and relative humidi *Subject Headings:* **1. Annual meteorological data summaries 2. Climatic data 3. Cumberla Bay, South Georgia.**—*M.R.*

7.11–114 551.506.1(6

*Sudan. Meteorological Service, **Annual meteorological report, 1950, 1954.** both p Khartoum, **1955.** almost entirely tables. **DWB**—Complete monthly and annual summar of data for 61 stations in the Sudan include data on pressure (06, 12, and 18 h); maximu

imum and mean temperature; wet bulb temperature, vapor pressure and relative humidity 6, 12 and 18 h; rainfall, wind, number of days with maximum and minimum temperature ve (or below) specified temperatures (25°, 30°, 35°, 40°, and 45°C, 5°, 10° . . . 30°C); id amount and visibility at 06, 12 and 18 h; and daily sunshine and evaporation. At some he stations pressure, wind, cloud and visibility are not recorded. Precipitation tables give nthly and annual total and number of days ⩾1 or 10 mm and maximum 24 hr rain for ut 400 stations. This is the first annual summary for Sudan. Data for years before as l as after 1950 will be published eventually. *Subject Headings:* **1. Annual meteorological a summaries 2. Sudan. I. Ireland, A. W.**—*M.R.*

7.11–115 551.506.1(624):551.577

*Sudan. Meteorological Service, **Monthly rainfall statistics (whole millimetres).** en- ly tables. First issue seen, Jan. **1947**–. Latest issue seen, May **1955. DWB.** Also its: **nthly rainfall statistics (whole millimetres), Available amendment and addenda, April 3–Jan. 1954.** 2 p. entirely tables. **DWB**—Data for 158 stations in Sudan are included his monthly bulletin, which consists of years of record, total rainfall for month in 1953 to 4 and average for entire period of record; total for year to end of month for 1953, 1954 and iod of record; maximum in one day and date, and number of days with at least 1 or 10 mm rain. Amended data for April 1953–Jan. 1954 consists of similar data for from one to 12 tions per month. *Subject Headings:* **1. Monthly data bulletins 2. Rainfall data 3. Sudan.** *M.R.*

7.11–116 551.506.3:551.524.36:551.571.36(421)

*Shellard, H. C., **Distribution of hourly values of dry-bulb and wet-bulb temperatures, oydon, 1945–54.** *Great Britain. Meteorological Office, British Climatological Branch, emoranda*, No. 1, **1956.** 9 p. 4 figs., 3 tables. Mimeo. **GB-MO**—Numbers of hours are nulated by months and year in 2°F steps and also expressed as hours and percentages above en limits. Frequency histograms and ogives are drawn for each month and for the year. *bject Headings:* **1. Temperature frequencies 2. Wet bulb temperature frequencies 3. Croy- n, London, Eng.**—*C.E.P.B.*

7.11–117 551.506.7:551.507.362:551.510.5

*Stroud, W. G.; Nordberg, W. and Walsh, J. R. (all, *Signal Corps Engr. Labs., Fort Mon- uth, N. J.*), **Atmospheric temperatures and winds between 30 and 80 km.** *Journal of ophysical Research*, Wash., D. C., 61(1):45–56, March **1956.** 5 figs., 4 tables, 9 refs., 4 eqs. C—The method and analysis of the rocket-grenade experiment are briefly described. The l values of temperatures and of wind speeds and directions between 30 and 80 km obtained ring 12 Aerobee rocket firings are summarized. The mean temperature distribution has a aximum of about 270°K at 50 km, with a lapse rate of about 2.5°/km above the peak. The nds are strong and from the west during the winter months (Oct. through Feb.); less strong d from the east during the summer months (April through Aug.); and are comparatively ak and predominantly from the north during the fall (Sept.). The maximum wind speed easured was a value of 104 m/sec at 55 km during a winter firing. The average probable or for the temperature data is ±5°C; the average errors in wind speed and direction are 10 m/sec and ±18°, respectively. *Subject Headings:* **1. Rocket grenade data 2. Upper at- osphere research.**—*Authors' abstract.*

INSTRUMENT CARRIERS

See also: **Temp. and wind at 30 80 km.** (Stroud et al.), 7.11–117; **Stratospheric turbulence** (Lettau), 7.11–217.

7.11–118 551.507.321.2:679.5:608(088.8)

Great Britain. Patent Office, **Improvements in or relating to a method of forming a ad-carrying balloon and the resulting product.** Its *Patent Specification*, 735,614, **1955.** figs. **GB-MO**—Specifications of a patent filed by General Mills Inc. describing construction d operation of a non-extensible sealed balloon of thermoplastic material such as polyethylene

suitable for meteorological purposes requiring constant height. Method of inserting a m... is described. *Subject Headings:* **1. Plastic balloons 2. Patents.**—*C.E.P.B.*

7.11–119 551.507.321.2:55...

Hering, W., **Betrachtungen über die Veränderlichkeit der Aufstiegsgeschwindigke... Radiosonden-Ballone.** [On the variability of velocity of ascent of radiosonde ball... *Zeitschrift für Meteorologie*, 10(2):57–62, Feb. **1956.** 3 figs., 3 tables, 7 refs. **DLC**—... ascensional velocity from ground to 100 mb is examined for 148 ascents at Lindenb... May–July 1953, for day and night. The mean was 344 m/min with scatter ranging from ... at 700–500 mb to 29.5 at 1000–900 mb. The mean departure ranged from −40 m/m... 0.1 km to +36 at 12 km and 0 at 15 km. The causes are found in turbulence and the ... perature difference between gas in the balloon and the outside air. *Subject Headings:* **1. Ba... ascension rates 2. Lindenberg, Germany.**—*C.E.P.B.*

7.11–120 551.507...

Ikeda, H., **Measurement of the elasticity of rubber skin for sounding balloon.** *Jo... of Meteorological Research*, Tokyo, 7(3):169–176, March **1955.** 7 figs., 3 tables, eqs ... Japanese; English summary p. 169. **DWB**—The elasticity of rubber skin in the state elong... both longitudinally and transversally was measured by means of a simple apparatus. ... the linear elongations in two perpendicular directions are λ and μ times the natural le... respectively, the tensions are given by

$$T\lambda = \frac{\delta_0}{\lambda\mu} e^{c(\lambda-1)+b(\mu-1)}, \qquad T\mu = \frac{\delta_0}{\mu} e^{b(\lambda-1)+c(\mu-1)},$$

where $b = 0.71$, $c = 0.20$ and δ_0 is the natural thickness of the rubber skin. The time e... of elasticity and the elastic properties at low temperatures are expected to be reporte... future. *Subject Headings:* **1. Sounding balloons 2. Balloon elasticity.**—*Author's abstract*

7.11–121 551.507.321.2:551.508...

Khakhalin, V. S., **Startovaia mashinka dlia vypuska radiozondov pri sil'nom w...** [Starting machine for releasing radiosonde during strong wind.] *Meteorologiia i Gidrolo...* Moscow, No. 3:50–51, May/June **1955.** 3 figs. **DWB**—A reel-like device for relea... radiosonde balloons during strong winds and its use are described with the aid of diagra... *Subject Heading:* **1. Radiosonde balloon release.**—*I.L.D.*

7.11–122 551.507.321.4:551.508.5:551.551:551.5...

Jones, J. I. P., **A vertical gustiness recorder for use with a captive balloon.** *Great Br... Meteorological Research Committee, M.R. Papers*, No. 974, Feb. 28, **1956.** 3 p. 6 figs. Mi... **DWB.** Also issued as *Porton, England. Chemical Defence Establishment, Porton Techn... Paper*, No. 536, Feb. 28, **1956. GB-MO**—This lightweight instrument consists of a b... wood and tissue paper inclination vane which actuates a potentiometer, and a windmill t... anemometer, at either end of a suspended arm damped to prevent oscillation. Gro... recording is electrical. Photos, wiring diagrams and specimen records are shown. *Sub... Headings:* **1. Gust measurement equipment 2. Captive balloon instruments.**—*C.E.P.B.*

7.11–123 551.507...

Singer, S. Fred (*Maryland Univ.*), **Studies of a minimum orbital unmanned satellite ... the earth (MOUSE), Pt. 1, Geophysical and astrophysical applications.** *Astronautica A...* Vienna, 1(4):171–184, **1955.** 3 figs., 11 refs. German and French summaries p. 171–1... **DWB**—Some of the fields of research which would open up with the establishment of ... artificial earth satellite are discussed, namely continuous observation of solar ultraviolet a... X radiation, research into the causes of magnetic storms and auroras, observation of cos... rays and micrometeorites, measurement of the earth's albedo, study of the ionosphere, a... investigation of density, winds, temperature and turbulence in the outermost atmosph... A satellite with instruments weighing a total of 50 pounds is believed to be adequate for s... measurements. **Pt. 2, Orbits and lifetimes of minimum satellites,** presented as paper

Y. meeting, American Rocket Society, Dec. **1954.** (Unchecked). *Subject Headings:* **Satellite observatories 2. MOUSE observation.**—*G.T.*

7.11–124 551.510.53:551.507.362 551.507.362:551.547

*LaGow, H. E. and Ainsworth, J. (both, *U. S. Naval Res. Lab., Wash., D. C.*), **Arctic per-atmosphere pressure and density measurements with rockets.** *Journal of Geophysical search*, Wash., D. C., 61(1):77–92, March **1956.** 13 figs., 2 tables, 19 refs., 4 eqs. **DLC**— ta were obtained from four balloon-launched Deacon rockets in N.E. Canada during the nmers of 1953 and 1954, without the aid of ground-based trajectory measurements. The nospheric density profile in the 25- to 45-km region was found within the experimental or to be the same as the Rocket Panel, White Sands values. The measured atmospheric essure and the computed temperature for the flights at 62° and 74° north were found to up to 30% higher in the 30- to 45-km region, but approximately equal to the White Sands lues at 70 km. At 74°N, a high lapse-rate is indicated within the region 44 to 60 km. *bject Headings:* **1. Rocket measurements 2. Upper air pressure 3. Upper atmosphere nsity 4. Arctic.**—*Authors' abstract.*

INSTRUMENTS

See also: **Temp. measurement and control** (Am. Inst. Physics), 7.11–2; **Generation of elec. by wind power** (Golding), 7.11–5; **Met. instruments** (Gt. Brit. Met. Office), 7.11–19; **Potato blight forecast recorder** (Grainger), 7.11–81; **Bacteriophages and UV dosimetry** (Eschke), 7.11–90; **Determination of wind direction and speed . . .** (Lebedev), 7.11–105; **Starting machine for radiosonde release** (Khakhalin), 7.11–121; **Vertical gustiness recorder** (Jones), 7.11–122; **Dew measurement** (Krhounek), 7.11–244.

7.11–125 551.508.25

Skeib, Gunter, **Die Weiterentwicklung des rotierenden Strahlungsumsatzmessers mit duktiver Übertragung der Messspannung.** [The further development of the rotating diation balance meter with inductive transmittance of the measurement potential.] *Zeitschrift für Meteorologie*, 10(2):33–38, Feb. **1956.** 5 figs., 10 refs. **DLC**—Radiation balance eters must be freely exposed to radiation of all wave lengths. This makes them subject a variable wind factor due to turbulence. Strong ventilation to overcome this gives a e-sided effect, which author avoids by including a motor to rotate the measuring plate. notos and wiring diagrams are included. Sensitivity can be increased selectively and other finements are described. *Subject Heading:* **1. Radiation balance meters.**—*C.E.P.B.*

7.11–126 551.508.71

Ernsberger, F. M. and Pitman, H. W. (both, *U. S. Naval Ordnance Test Station, China ake, Calif.*), **New absolute manometer for vapor pressures in the micron range.** *Review of ientific Instruments*, N. Y., 26(6):584–589, June **1955.** 4 figs., table, foot-refs. **DLC**— n absolute manometer is described which provides a means of measuring vapor pressures the range 0.5 to 20 microns with a precision and accuracy of better than one percent. Conuction and use of the manometer is described in detail and an analysis of the possible sources error is given. The vapor pressure of mercury has been determined and is presented to give example of the performance of the manometer. *Subject Headings:* **1. Manometers 2. Vapor essure recorders 3. Instrument accuracy.**—*Authors' abstract.*

7.11–127 551.508.71

Goldsmith, P., **A method of increasing the range of the Dobson-Brewer frost-point grometer in jet aircraft.** *Royal Meteorological Society, Quarterly Journal*, 81(350):607–609, t. **1955.** 2 figs., 3 refs. Also issued as *Great Britain. Meteorological Research Committee, .R.P.*, No. 859, March 25, **1954.** (*See item* 6.4–68, April 1955, *MAB.*) **DWB**—The range the hygrometer can be extended to frost points below −120°F at 30,000-50,000 ft by pplying it with compressed air from the engine compressor of a jet aircraft. *Subject Heading:* **Dobson-Brewer frost point hygrometer.**—*C.E.P.B.*

7.11–128 551.508.71:551.

Underwood, R. C. and Houslip, R. C. (*Medical Res. Council Labs., London*), **Beha... of humidity-sensitive capacitors at room temperatures.** *Journal of Scientific Instru...* London, 32(11):432–436, Nov. **1955.** 7 figs., 3 refs., 3 eqs. **DWB, DLC**—Measurement... the humidity in small enclosed spaces are not easily performed with the conventional typ... hygrometer, but the capacitance hygrometer developed by JASON enables such measure... to be made. An investigation of the behavior of the hygrometer at room temperature... carried out using a divided-flow apparatus and a sensitive dew point hygrometer. ... capacitance hygrometer responded to changes in both temperature and humidity, and ... pirical equation relating the impedance of the instrument (measured at 1 kc/s), the air ... perature and the water-vapor pressure, was found. The response of the hygrometer to ch... in water-vapor pressure was found to depend on the frequency of the applied potential d... ence, the sensitivity decreasing as the frequency was increased. The hygrometer foll... changes in humidity very rapidly so long as the relative humidity was less than about ... At higher relative humidities the response was slow. It was concluded that the behavi... the instrument was consistent with the adsorption of water-vapor on the dielectric mat... The opinion is expressed that the instrument may be of considerable value for measurem... in small spaces. *Subject Headings:* **1. Capacitance hygrometers 2. Aluminum oxide... grometers.**—*Authors' abstract.*

7.11–129 551.50...

Wexler, Arnold; Garfinkel, Samuel B.; Jones, Frank E. et al., **Fast responding ele... hygrometer.** *U. S. National Bureau of Standards, Journal of Research*, 55(2):71–78, Aug. ... 6 figs., 3 tables, 10 refs. **DWB**—The performance characteristics of a fast responding ele... hygrometer of high sensitivity are presented in some detail. The hygrometer is mad... evaporating, under vacuum, potassium metaphosphate to obtain a thin film of materi... micro-inches thick) on a specially treated glass blank. The logarithm of the resistan... approximately linear with relative humidity at constant temperature. The resistances ... from 4×10^4 to 10^{13} ohms. For the temperature range of $-40°$ to $+40°$C, a group of ne... parallel calibration curves is obtained. The manufacturing process is sufficiently well ... trolled so that hygrometer elements, made in different batches, closely conform to a m... calibration curve. The average hysteresis for the hygrometer element over the tempera... range 0° to 40°C is 2.7% relative humidity. The polarization effect for reversed direct cur... loading (1 min cycles) is of the order of 0.3% relative humidity at the end of two hours; ... 1.4 to 2.2% for intermittent direct current loading (15 sec on, 45 sec off); and it is 3.7 to 6... for continuous direct current loading. Elements aged by humidity cycling appear to be ... subject to polarization. Following a discrete change in relative humidity, the average respo... time of the element for a 63% change in indication at −20°C, with an air velocity of 800 ft ... parallel to the long edge of the element is 1.9 sec for a relative humidity change from 41... 82.3% (with respect to water); it is 3.4 sec for the same relative humidity change in the rev... direction. Times for 90% change in indication are 5.0 and 16.4 sec, respectively. At r... temperature, the average response time, for a 63% change in indication with a velocity ... 768 ft/min, is 0.10 sec for a discrete change in relative humidity for 33 to 80%, and 0.42 ... for the same change in the reverse direction. Corresponding times for 90% change are ... and 11.2 sec. In comparison with lithium chloride elements currently produced for radiosо... use, the response time of the elements was found to be less by at least an order of magnitu... *Subject Headings:* **1. Electric hygrometers. I. Hasegawa, Saburo II. Krinsky, Alber...** *Authors' abstract.*

7.11–130 551.508...

Woollum, C. A. (*W.B. Airport Sta., Wash., D. C.*), **Simplified all-weather remote p... chrometer.** *Weatherwise*, 8(2):52–53, 57–58, April **1955.** 3 figs. **DWB**—Diagrams sh... construction of apparatus for measuring dry and wet bulb temperature at a distance. Th... mistor elements, rotary exhaust fan to ventilate wick on wet bulb and nomogram for ra... calculation of relative humidity are features of the simple yet effective system for tele-hyg... thermoscopy. (*See also* 6.6-93, June 1955, *MAB.*) *Subject Headings:* **1. Remote read... psychrometers 2. Telethermographs 3. Thermistors for psychrometers.**—*M.R.*

7.11–131 551.508.77:778.3 551.508.71:778.3

Dyke, G. V. and Knowles, G., **Recorder for humidity and rainfall.** *Institution of Water Engineers, London, Journal*, 10(2):171–177, March 1956. 5 figs., 11 refs. DWB—An apparatus has been developed at the Water Pollution Research Laboratory, Stevenage, by which photos of a wet and dry bulb hygrometer and a raingage are taken at 4 hr intervals. The raingage recording is electrical; circuits are shown. Comparisons gave good results. *Subject Headings:* 1. **Humidity instruments** 2. **Rainfall recorders** 3. **Photographic recorders.**—*C.E.P.B.*

7.11–132 551.508.77:551.524.37

Zobel, Hermann and Reinecke, Horst, **Entwicklung und Erprobung eines winterfesten Regenschreibers.** [Development and testing of a winter registering raingage.] *Meteorologische Rundschau*, 9(7/8):147–149, July/Aug. 1956. 3 figs., table, 2 refs. DWB—Various means of keeping autographic raingages working below 0°C are discussed. A gage heated by propane flame is described with appropriate insulation and ventilation. A flask of 11 kg propane lasted 2 months. *Subject Heading:* 1. **Heated raingages.**—*C.E.P.B.*

7.11–133 551.508.91

Lodge, James P., Jr., **An automatic air sampler for use with membrane filters.** *Journal of Meteorology*, 13(4):406–408, Aug. 1956. 6 figs., 5 refs. DWB—An apparatus automatically collecting samples of soluble airborne particles at 1 hr intervals on millipore filter tape is described and illustrated. A vane directs the nozzle into the wind. The duration of sampling may be varied from 3–57 mm. *Subject Headings:* 1. **Nuclei samples** 2. **Air sampling instruments.**—*C.E.P.B.*

7.11–134 551.508.94:551.594

Kühn, Udo, **Die Feinstruktur des luftelektrischen Feldes, aufgezeichnet mit einer Radmessmaschine, und die Registrierung des Spitzenentladungsstromes.** [The fine structure of the atmospheric electric field, recorded with a field measuring apparatus, and the recording of the point discharge current.] *Zeitschrift für Meteorologie*, 10(5):147–155, May 1956. 6 figs., 29 refs. DLC—A field meter able to measure up to 4500 V/m is described with wiring diagram. Four types of field strength variation are listed and curves showing fine-scale variations in haze, mist and thunderstorms reproduced. With strong fields in bad weather there are out or in spark discharges; an apparatus for measuring these is described with diagram and a curve given. *Subject Headings:* 1. **Atmospheric electricity measurement** 2. **Atmospheric electricity variations.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Collected sci. papers** (Academia Sinica), 7.11–1; **Med.-met. forecast** (Kulinke), 7.11–3; **Synoptic processes** (Isaev), 7.11–9; **Mesoanalysis** (Fujita, et al.), 7.11–16; **Radar weather echoes and forecasting** (Gt. Brit. Naval Weather Serv.), 7.11–20; **Atlas of Northern Hemisphere upper air charts** (U. S. Air Weather Serv.), 7.11–22; **Objective forecasting** (U. S. Air Weather Serv.), 7.11–23; **Objective forecasting of sub-min. weather** (Phillpot, Stevenson), 7.11–72; **Wind forecasts accuracy** (O'Carroll), 7.11–73; **Restricted morning visibility** (Johnson et al.), 7.11–74; **Objective forecasting of min. conditions** (Maher), 7.11–75; **Vineyard protection against frost** (Tsuboi et al.), 7.11–78; **Potato blight forecasting** (Grainger), 7.11–81; **Forecast interpretation from charts and graphs** (Cramer), 7.11–83; **Isobaric divergencies in nor'westers** (Bose), 7.11–166; **High level cyclogenesis** (Kleinschmidt), 7.11–178; **Time changes of elliptically distributed winds** (Scott), 7.11–233; **Height distribution of clouds** (de Bary, Möller), 7.11–249; **Winter rainfall forecasting** (Swayne), 7.11–256.

7.11–135 551.509:621.39

Hanson, W. R., **WEA: an automatic weather-forecast service.** *Meteorological Magazine*, London, 85(1009):200–202, July 1956. 2 photos. DWB—The service began March 5, 1956, to provide a 9 hr forecast for the London area. The Meteorological Office provides the forecasts and the General Post Office records them on magnetic tape. The forecasts are

revised whenever required by a changing weather situation. In the first month there 561,377 calls. *Subject Heading:* **1. Telephonic weather forecasts.**—*C.E.P.B.*

7.11–136 551.509.31:551.5

Pône, R., **Résultats provisoires d'une méthode d'analyse en altitude utilisée en Fr** [Preliminary results of a method used in France for high level analysis.] *I.U.G.G. As tion of Meteorology, Brussels, 1951, Procès-Verbaux des Séances, Mémoires et Discussion*, p. 105, pub. **1953. DWB**—The method utilizes the potential pseudoadiabatic temper showing the results of soundings on charts. It enables one to study the structure of a pheric disturbances, the circulation of air masses and the relation between tropospheri lower stratospheric air masses. No details are given. *Subject Headings:* **1. Synoptic an 2. Tropospheric soundings.**—*A.A.*

7.11–137 551.509.312:551.

Bolin, Bert (*International Met. Inst., Stockholm*), **An improved barotropic model and aspects of using the balance equation for three-dimensional flow.** *Tellus*, Stockholm, 8(1 75, Feb. **1956.** 5 figs., 2 tables, 9 refs., 40 eqs. **DLC**—A few suggestions for improvin *barotropic* model presented in a previous article (Bolin, 1955) have been tested. The re show that replacing the geostrophic relation by a more general balance equation improve forecasts over 24 hrs in certain respects. Furthermore the incorporation of the effects stratosphere in a very approximate way gives a better description of the behaviour o largest scales of motion in the atmosphere. The application of the balance equation in nu ical forecasting is extended to three-dimensional *baroclinic* flow. It is shown that the crit of integrability of the balance equation to obtain the stream function from a knowledge o pressure field has to be satisfied in the course of the computations to maintain elliptic char of the equations. *Subject Headings:* **1. Barotropic models 2. Numerical forecastin** *Author's abstract.*

7.11–138 551.509.312:551.511:551.5

Dady, G. (*Obs. de Magny-les-Hameaux*), **Deux aspects des prévisions numériqu l'aide du modèle barotropique.** [Two aspects of numerical forecasting with the aid of barotropic model.] *La Météorologie*, Paris, Ser. 4, No. 37:63–76, Jan./March **1955.** 6 eqs. French, English and Italian summaries p. 64. **DWB**—An attempt to popularize method of the barotropic model and to show how this method can be carried out by a nume computer or by a technique of graphic construction. The author describes tests made at Institute of Meteorology of Stockholm under the direction of Rossby, and gives a gen explanation of the techniques of the barotropic model and a description of forecasts made the BESK computer and the Fjortoft graphical method. The BESK computer is illustra and the area analyzed by the electronic computer for numerical predictions is shown Northern Hemisphere chart. *Subject Headings:* **1. Numerical forecasting 2. Barotr model 3. Electronic computers.**—*A.M.P.*

7.11–139 551.509

de Lisle, J. F. and Kerr, I. S., **Note on Fjørtoft's graphical method of integration of barotropic vorticity equation.** *New Zealand. Meteorological Service, Technical Note*, No. Oct. 6, **1954.** 6 p. 4 figs., 2 refs. **DWB**—The method used by Fjørtoft (1952) to a slowly changing velocity field enabling advection to be done in 24 hr steps is shown to applicable only to a grid length equal to one quarter the wavelength of the fastest wave c ponents. Thus a very broad specification of the vorticity field is all that is possible. *Sub Headings:* **1. Fjørtoft's graphical method 2. Barotropic vorticity equations.**—*Authors' abstr*

7.11–140 551.509.

Fjortoft, Ragnar (*Univ. of Copenhagen*), **On the use of space-smoothing in physi weather forecasting.** *Tellus*, Stockholm, 7(4):462–480, Nov. **1955.** 4 figs., 6 refs., 115 **DWB, DLC**—Extends the treatment of the author (*see* 4.10-71, Oct. 1953, *MAB*) on sp smoothing of horizontal stream field in the barotropic model to an improved technique sidering "unsmoothing" as a method of obtaining a spectral analysis of horizontal sca

ls and to remove systematic errors due to using finite differences as derivatives. A general rem for trajectory or displacement of barotropic flow and applications of smoothing to this blem is followed by consideration of the baroclinic case (vertical velocity, and deformation ct on interchange of potential and kinetic energy). In the following sections, the impor- ce of nonlinear interference for creation and geographical distribution of disturbances, the gration problem and a simple nonadvective model are treated. The trajectory problem levels other than the vertically mean level is discussed. *Subject Headings:* **1. Space- oothing techniques 2. Numerical forecasting.**—*M.R.*

7.11–141 551.509.312:551.547 551.511

Maine, R. and Pierrehumbert, C. (both, *Central Met. Bureau, Melbourne*), **Constant solute vorticity trajectories.** *Australian Meteorological Magazine*, Melbourne, No. 8:37–47, rch 1955. 4 figs., 2 tables, 5 refs., 7 eqs. **DWB**—A graphical method of solution of the ation of conservation of absolute vorticity is produced and the result applied to the 500 mb stant pressure surface. A more readily applicable though approximate mathematical rnative solution is also obtained. Forecasts made from the results of the solution of the ation at a fixed point are subjected to a verification test. These results are examined their degree of significance. The limited number of forecasts made are found to present od agreement with actual conditions when caution is exercised in the selection of an initial d. *Subject Headings:* **1. Constant absolute vorticity trajectories 2. Constant pressure face forecasts.**—*Authors' abstract.*

7.11–142 551.509.312:519.281.2

Thompson, Philip Duncan (*U. S. A. F. Joint Numerical Weather Prediction Unit*), **Op- num smoothing of two-dimensional fields.** *U. S. Joint Numerical Weather Prediction Unit*, ril 26, 1955. 30 p. 3 figs., 2 refs., 11 eqs. **DWB**—The problem of smoothing out non- stematic errors in a 2-dimensional field of measurements has been studied from the stand- int of minimizing the RMS difference between the true field and an arbitrarily weighted a average of the field of observations. For fields whose space-autocorrelation functions e invariant with rotation and have a simple and rather typical form, the optimum weighting nction is a linear combination of Bessel functions, whose nondimensional rate of decay pends partially on the so-called "signal-to-noise" ratio, but primarily on the ratio of the ues of the true field and error field. A comparison of optimum averaging with the analyst's ojective process of smoothing indicates that the former is significantly superior in its ability distinguish between random small-scale fluctuations and minor synoptic features of only ghtly greater scale. Finally, the minimum RMS error of linearly smoothed fields is ex- essed in terms of the statistical properties of the true fields and the observing system itself. *bject Headings:* **1. Numerical forecasting techniques 2. Two-dimensional smoothing.**— *uthor's abstract.*

7.11–143 551.509.312:533.6

Thompson, Philip Duncan (*U. S. A. F.*), **Theory of large-scale disturbances in non- ostrophic flow.** [U. S. Joint Numerical Weather Prediction Unit], March 30, 1955. 41 p. refs., 35 eqs. **DWB**—The primary aim of this paper is to derive a complete system of odified hydrodynamical equations, which govern a large class of "meteorological" motions the atmosphere, but which cannot generate solutions corresponding to sound and gravity ves. By a detailed analysis of the motions of a linear system, it has been found that the nission of the total derivative of the horizontal divergence from the divergence equation is cessary to exclude gravity wave solutions. In effect, this modification diverts all of the nsformed internal and potential energy into the wave energy of the large-scale disturbances. slightly stronger form, this type of modification is also *sufficient* to exclude gravity wave lutions from the general nonlinear equations, and is essentially a generalization of the ltering approximations" introduced by CHARNEY (1948). The scheme proposed for in- grating the modified nonlinear equations is an iterative method, whereby a conditionally nvergent sequence of approximate solutions can be generated from a known initial dis- ibution of pressure. This method is applied to the solution of a system of equations which e one order of approximation higher than the equations of quasi-geostrophic motion, and

provides the basis for a practicable method of numerical forecasting. *Subject Heac* **1. Numerical forecasting 2. Equations of motion.**—*Author's abstract.*

7.11–144 551.509.33:551.50

Clapp, Philip F., **Some considerations involved in preparing long-range forecast numerical methods.** *Journal of Meteorology*, 13(4):341–350, **1956.** 8 figs., 18 refs., 6 **DWB**—The integrated vorticity equation is applied to 5-day mean charts of upper level over the Northern Hemisphere for numerical calculation of 700 mb flow up to 5 days a The problem of monthly forecasts is then considered. It is not possible to take into acc the eddy transport of vorticity, but it is considered that this may either be disregarde statistically determined from the large-scale circulation. A modified conservation equa may be a possible method. Results are sufficiently encouraging to suggest the lines continued investigation. *Subject Headings:* **1. Long range forecasting 2. Numerical casting techniques.**—*C.E.P.B.*

7.11–145 551.509.33:551

Müller-Annen, Hans, **Zonal-Index, Luftdruck der Nordhalbkugel und die Witterun Nordwestdeutschland. Untersuchungen, Gedanken und Methoden zur Langfristvorhers 9 Beitrag.** [Zonal index, pressure of the Northern Hemisphere and weather in North- Germany. No. 9 of investigations, ideas and methods in long-range forecasting.] *Ann der Meteorologie*, Hamburg, 6(11/12):342–356, **1953/54.** fig., 15 tables, 12 refs. German English summaries p. 342. **DWB**—The zonal index 35–55°N for the Northern Hemisphere E and W halves and Azores-Iceland were calculated for each month for 40 yrs and exam harmonically and statistically. Autocorrelation showed cycles of 6, 10–11, 13, 18, 24, 32 44 yrs in zonal index and 3–4, 6–8, 16–17, 24, 32 and 48 yrs in pressure. These are synthes and extrapolated to 1970. The relations between zonal index, pressure and weather in N Germany are investigated statistically for individual months and shown in numerous tal including some with weather a month after the zonal index and pressure. Warm dry sum are associated with a meridional circulation, warm rainy summers, especially Junes, wi high zonal index and monsoon effect. *Subject Headings:* **1. Zonal index 2. Long range f casting 3. Germany.**—*C.E.P.B.*

7.11–146 551.509.33

Trenkle, H., **Ein Beitrag zur Vorhersage der Dezembertemperatur.** [A contributio forecasting December temperature.] *Meteorologische Rundschau*, 9(7/8):142–147, July/A **1956.** 4 figs., 4 tables, 11 refs. **DWB**—Five-day means of temperature at Karlsruhe in year 1869–1954 show that if pentads 52, 60 and 61 are warm, Dec. will probably be warm central Europe. If pentad 53 is warm and 60 cold, Dec. will probably be cold. At l −1°C in pentad 60 and +1°C in 64 give high probability of a cold Dec. These connect are explained by 5-day means of pressure and pressure anomaly over W. Europe, and attributed to large-scale processes. *Subject Headings:* **1. Long range forecasting 2. Germa** —*C.E.P.B.*

ARTIFICIAL PRECIPITATION

See also: **Adsorption in heterogeneous nucleation** (Birstein), 7.11–243.

7.11–147 551.509.67:551.574.1:551.573:551.578

Sutcliffe, R. C., **Rain: natural and artificial.** *British Journal of Applied Physics*, 7(3): 88, March **1956.** 7 refs. **DLC**—Mean annual rainfall over the globe is about 90 cm and s 20% of sun's radiation energy is used to evaporate this amount. Vertical and horizon transport of water vapor, formation of rain clouds, and instability are discussed genera attack by mathematical physics is imminent. Nuclei provide for condensation as cl particles. Coagulation to form rain has critical features which might permit artificial cont but there is as yet no convincing evidence of the economic usefulness of the seeding meth hitherto tried. Various other possibilities are discussed. *Subject Headings:* **1. Precipitat mechanism 2. Artificial precipitation.**—*C.E.P.B.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Photochemical processes in urban air** (Leighton, Perkins), 7.11–15; **CO_2 theory of climatic change** (Plass), 7.11–17; **Atmos. chemistry** (Eriksson), 7.11–44.

7.11–148 551.510.3:551.510.53:523.5

Öpik, E. J., **Meteors and the upper atmosphere.** *Irish Astronomical Journal*, Armagh, 3(5):165 181, June 1955. 6 tables, 32 refs., 5 eqs. **DLC.** Reprinted as: *Armagh, Ireland. Observatory, Leaflet*, No. 30. **DWB**—Up to 75 km the current meteor theory calculations of atmospheric density (Whipple 1943, 1949) check with rocket data obtained at White Sands, N. Mex.: above 75 km the calculated densities are about 90% too high (95 km, Whipple, 1952). Author shows that an assumption that only hard meteors reach levels <75 km whereas fluffy or spongy objects, which would crumble into thousands of pieces of dust, would be visible but never reach lower levels, could account for discrepancy in theory. The classical idea that spraying of hot liquid particles occurs from hard meteors would not be refuted by the above hypothesis, as it would deal with a special case. The pressure necessary to break up the "dustballs" would be about 10^4 dynes/cm². Ionization is discussed and tables presented for calculating ionizing efficiency of atomic collisions in air, decay of molecular ions in the ionized column of stony meteors through dissociative recombination, and selectivity of radar observations at 8.13 m for average dustball meteors. Radar observations are not considered to be statistically fit to deal with hyperbolic meteors or the general distribution of meteor velocities. *Subject Headings:* **1. Meteor ablation theory 2. Upper atmosphere densities from meteors 3. Radar meteor observation.**—*M.R.*

7.11–149 551.510.41:546.264(48)

Fonselius, Stig (*Int. Met. Inst., Stockholm*); Koroleff, Folke (*Inst. of Marine Res., Helsinki*) and Wärme, Karl-Erik (*Int. Met. Inst.*), **Carbon dioxide variations in the atmosphere.** *Tellus*, Stockholm, 8(2):176–183, May **1956.** 7 figs., 2 tables, 30 refs. **DLC**—The Scandinavian CO_2-sampling in 1955 is described. The mean results for the calendar year are given. Earlier CO_2-measurements are discussed and a figure showing most of these values is given. The theory of CALLENDAR is discussed and the Scandinavian values are compared with CALLENDAR's. The seasonal variations at the Scandinavian stations are compared and the results discussed. The possibility of drawing synoptic maps is discussed and one example is shown. The desirability of systematic CO_2-measurements on a global scale is emphasized. *Subject Headings:* **1. Carbon dioxide variations 2. Scandinavia.**—*Authors' abstract.*

7.11–150 551.510.41:546.294/5

Glueckauf, E. and Kitt, G. P., **The krypton and xenon contents of atmospheric air.** *Royal Society of London, Proceedings, Ser. A*, 234 1199):557–565, March 6, **1956.** 3 figs., 3 tables, 9 refs. **DWB**—A method is described for measuring the proportion of krypton and xenon in dry air by distillation and low temperature gas chromatography. The content found (by volume) is: krypton 1.14×10^{-6}, xenon 0.086×10^{-6}. *Subject Headings:* **1. Atmospheric composition 2. Krypton 3. Xenon.**—*C.E.P.B.*

ATMOSPHERIC POLLUTION

7.11–151 551.510.42

Goetz, Alexander (*Calif. Inst. of Tech.*), **Basic problems in the detection of microbiological air pollution.** *American Industrial Hygiene Association, Quarterly*, 16(2):113–120, June **1955.** fig., 11 refs. **DLC**—The problems encountered in the microbiological assay of aerosols arise from the generally low mass ratio between the suspended particles and the suspended air volume, the influence of nonbiological, chemical or physical particles which are potential inhibiting substances, and the relative instability of aerosols. The limitations of procedures for assaying the microbiological content of air, especially with regard to the viability

of organisms in sampled air, is considered. The pureness and consequences of interp... interaction within an aerosol are analyzed and suitable methods of aerobiological ass... outlined. *Subject Headings:* **1. Aerosol content of atmosphere 2. Atmospheric po... 3. Air sampling and analysis.**—*I.L.D.*

7.11–152 551.5...

Neiburger, Morris (*Air Pollution Foundation, Los Angeles*), **Tracer tests of the acc... of trajectories computed from the observed winds in the Los Angeles area.** *Air Pol... Foundation, Los Angeles, Report,* 1(7), April 1, **1955.** 59 p. 23 figs (incl. photos), 9 t... 4 refs. **DWB**—An elaborate network of wind and air sampling stations was used in th... Angeles Basin to test the effectiveness of fluorescent tracer methods vs. computed ai... jectories from pilot balloon observations. Arc of sampling stations had a radius of 13... Location of station, equipment (Parsons filter samplers) and results of 6 tests from Aug.–... 1954, weather conditions, particle size collected, effects of temperature, wind, trajec... computed by various analysts, movement and spreading of fluorescent cloud, trajec... traced backward or forward, upper level trajectories to base of inversion, etc. shown graph... and discussed. Surface trajectories showed slower movement and some deviation from a... movement. Trajectories drawn forward are more accurate than those drawn backward ... site of collection. *Subject Headings:* **1. Atmospheric pollution 2. Air sampling and ana... 3. Air trajectories 4. Los Angeles, Calif.**—*M.R.*

7.11–153 551.510.42:55...

Reidat, R., **Dunsthäufigkeit und Windrichtung am Niederrhein.** [Haze frequency... wind direction on the Lower Rhine.] *Meteorologische Rundschau,* 9(7/8):139–141, July/... **1956.** 3 figs., 2 tables, 2 refs. **DWB**—Haze due to smoke from cities can sometimes be tr... for 100 km. Examples of decreased visibility and weakened radiation up to 50 km ... centers in Germany are quoted. Figures of fog and haze show the loss of visibility in c... especially Essen (65% <4 km with NE winds). The relation of wind directions at diff... places in the Rhine valley is plotted, and a map of the distribution of haze frequency in... Lower Rhine with NE–E winds in the Ruhr region is given. *Subject Headings:* **1. Smoke ... 2. Germany.**—*C.E.P.B.*

7.11–154 551.510.42:551.575.1:551.588.7(...

Whiten, A. J., **The ventilation of Oxford Circus.** *Weather,* London, 11(7):227–... July **1956.** fig., ref. Also: Gold, E., **Smog: the rate of influx of surrounding cleaner ...** *Ibid.,* p. 230–232. **DWB**—Whiten points out that Gold (1954) observed that tempera... in Regent St., London, was 2°F higher than in nearby Hanover Sq., owing to convection ca... by heat from auto engines in Regent St. The rising air is replaced by inflow from open sp... and Whiten discusses the air tracks. Gold calculates the speed of air moving in str... parallel and perpendicular to the boundary of the heated region and finds values at end of... to 5th miles as 0.4 increasing to 1.69 kn and 4.0–5.9 kn, respectively. The bearing of thi... distribution of smog is considered. *Subject Headings:* **1. Smog 2. Urban influences 3. Il... don, Eng.**—*C.E.P.B.*

7.11–155 551.510.42:551.574.1:551...

Wootten, N. W., **Measurement of droplet size distribution in fog and smog.** *Por... England. Chemical Defence Experimental Establishment, Porton Technical Paper,* No. ... **1955.** 9 p. 7 figs., 2 tables, 9 refs. Mimeo. **DWB**—The use of Naphthol Green B... gelatine, in place of oil, as a coating for slides in the cascade impactor enables droplets d... to 1μ diameter to be retained. Calibration was by comparison with a sedimentation ... with oiled slides. The ratio of mean stain diameter to mean drop diameter was nearly c... stant at 2.5. Examples of drop size distribution in fog are given. Comparison with res... of other workers shows that the smallest drops are better represented and the median diam... is lower. Contamination by SO_3 and SO_2 can be measured by passing smog through fi... paper impregnated with 0.1% Thymol Blue or Astrozone Pink FG. *Subject Heading:* **1. D... size measurement.**—*C.E.P.B.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Earth as planet** (Kuiper), 7.11–4; **Solar activity and electrical wave propagation** (Hachenberg), 7.11–6; **Ionosphere** (Gautier), 7.11–25; **Vertical ozone distribution** (Epstein et al.), 7.11–103; **Temp. and wind at 30–80 km.** (Stroud et al.), 7.11–117; **Arctic upper atmos. pressure and density** (LaGrow, Ainsworth), 7.11–124; **High level analysis** (Pône), 7.11–136; **Meteors and upper atmos.** (Öpik), 7.11–148; **Stratospheric turbulence** (Lettau), 7.11–217; **Ionospheric winds** (Rao, Murty), 7.11–230; **Ionospheric obs.** (Banerjee et al.), 7.11–290; **Meteoric influences on sporadic E layer** (Neužil), **7.11–294; Sunset** (Darling, Ludlam), 7.11–296.

7.11–156 551.510.52/3

Havens, James M. and Baum, Werner A. (both, *Dept. of Met., Florida State Univ.*), **equency distributions of predominant tropopause heights along 80°W in summer.** *American eteorological Society, Bulletin,* 37(3):87–93, March **1956.** 7 figs., 4 tables, 10 refs., eqs. **WB**—Sample frequency distributions of height of the predominant tropopause in summer various latitudes along 80°W, as interpolated from analyzed tropopause-contour charts, e studied. At most locations the frequency distributions are such as to be statistically ceptable as being samples drawn from relatively simple theoretical parent distributions. It therefore possible to compute theoretical frequencies of predominant-tropopause height for dividual class intervals of height at these locations. *Subject Heading:* **1. Tropopause height equency distribution.**—*Authors' abstract.*

7.11–157 551.510.535:621.396.8

Delobeau, F. and Suchy, K., **L'absorption ionosphérique à Dakar.** [Ionospheric absorption at Dakar.] *Journal of Atmospheric and Terrestrial Physics,* London, 9(1):45–50, ily **1956.** fig., 2 tables, 8 refs. English summary p. 45. **DWB**—Ionosonde observations Dakar daily from June 1951 to end of 1954 on 2–8 MHz are discussed and decrements found. rom the monthly medians characteristics of absorption are calculated. Non-selective sorption increases with increasing sunspots; this is attributed to changes in the *D*-layer. elective absorption increases with decreasing sunspot numbers, which may be due to a lowering the middle height of the *E*-layer. *Subject Headings:* **1. Ionospheric absorption 2. Dakar, rench West Africa.**—*C.E.P.B.*

7.11–158 551.510.535:551.594.7

Ellis, G. R., **On the propagation of radio waves through the upper ionosphere.** *Journal f Atmospheric and Terrestrial Physics,* London, 9(1):51–55, July **1956.** fig., 2 tables, 7 refs., eqs. **DWB**—Since it is likely that electron densities of more than 0.1 electron per cm^3 ist at distances of several thousand kilometres from the earth, the propagation of the two w-frequency extraordinary modes through the ionosphere is improbable. Of the five possible ays in which waves can penetrate the lower ionosphere, we therefore have only three which an also penetrate the upper ionosphere. Of these three, the oblique longitudinal ordinary ode can produce only second-order observational effects in the absence of strong discrete ources of extra-terrestrial radiation, since its angular range is only about 1 degree (Ellis, 956). The low-frequency limit for the observation of cosmic radio emission will, therefore, general be that given by *fo*F2, and the observation of these radiations from below the nosphere is unlikely at frequencies much less than 1 Mc/s. *Subject Heading:* **1. Ionospheric adio wave propagation.**—*Author's conclusion.*

7.11–159 551.510.535:551.594.13

Hines, C. O., **Electron resonance in ionospheric waves.** *Journal of Atmospheric and errestrial Physics,* London, 9(1):56–70, July **1956.** 3 figs., table, 10 refs., 43 eqs. **DWB**—arge-scale travelling disturbances, now frequently observed in ionospheric F layer, are nterpreted in terms of an electron resonance. This phenomenon arises when an initial atnospheric disturbance sets the electrons into natural modes of oscillation, and the resultant ncrease of electron displacements then enhances the likelihood of detection by present (radio) echniques. Certain qualitative features of the observed disturbances can be explained on his basis, and a quantitative comparison provides estimates for several ionospheric parameters

which are in good agreement with the values expected. Further application of an imp theoretical development may well provide an extremely useful method of investigatin physical properties of the ionosphere. (*See also* 5.8–94, Aug. 1954, *MAB.*) *Subject Hea* **1. Ionospheric waves 2. Ionospheric electron resonance.**—*Author's abstract.*

7.11–160 551.510.535:621.38

Lauter, E. A., **Der atmosphärische Störpegel im Längstwellenbereich und seine und jahreszeitlichen Variationen.** [The atmospheric noise level in the longest wave r and its diurnal and annual variations.] *Zeitschrift für Meteorologie*, Berlin, 10(4):11 April **1956.** 12 figs., 11 refs. **DLC**—Problems of the definition and measurement of the level are discussed from measurements of dependence on frequency, and statistics, mospherics. The dependence of the noise level on ionospheric conditions and on th quency and position of centers of disturbance is shown from 3-year mean monthly di variations on 14, 27 and 48 kHz. This shows that in winter the distribution conditions d especially on the diurnal variation, but in summer on the approach of disturbance ce Some remarks are added on geophysical peculiarities in the recording of atmospheri turbances, such as interdiurnal variability, twilight effect and solar flare effect. *S Headings:* **1. Radio noise variations 2. Ionospheric variations.**—*Trans. of author's abstr*

7.11–161 551.51

Lepechinsky, D., **On the existence of a "Q.L."-"Q.T." "transition-level" in the ionosp and its experimental evidence and effect.** *Journal of Atmospheric and Terrestrial Ph* London, 8(6):297–304, June **1956.** 7 figs., 6 refs., 6 eqs. **DWB**—The magneto-ionic t shows that when the effects of collisions and of the earth's magnetic field are taken into sideration, the propagation is "quasi-longitudinal" in the lower part of the ionosphere, w the collision frequency is high and "quasi-transverse" in its upper part, where the col frequency is low. For vertical incidence, the altitude at which the transition betwee Q.L. and Q.T. regions occurs is that corresponding to the critical collision frequency ν_c w is a function of the gyrofrequency and of the magnetic dip angle only. For France, w this angle is 64° to 65°, the transition level is located at about 95 km, i.e., within the E re At midday, when the maximum electron density of the E layer occurs at the lowest hei it may happen that this maximum penetrates the Q.L. region. The evaluation of N_{max} sl therefore be made with caution, for in the latter case, the critical frequency observed responding to the ordinary trace vertical tangent), when used in the classical formula, valid in the Q.T. region, leads to a serious underestimate of N_{max}. When N_{max} is loc somewhat lower than the transition level, or exactly at this altitude, the $h'f$ record sh show either a crochet (in the first case), or a hollow, i.e., a complete absence of trace (i second case). Crochets and hollows of this sort are indeed quite often found in the $h'f$ re of the Poitiers and Domont stations. It is shown how these hollows and crochets can be explained on the basis of the magneto-ionic theory and that they are in fact an excellent dence of the existence in the E region of the Q.L.-Q.T. transition level. Finally, atte is drawn to the criteria now in use to determine the f_oE, which often leads to an appa flattening of the N_{max} diurnal curve, and appropriate formulas and methods are suggest find the correct values of N_{max}. *Subject Heading:* **1. Ionosphere research.**—*Author's abs*

7.11–162 551.510.535:537.56:551.59

Minnis, C. M., **The effective recombination coefficients in the E and F1 layers during solar eclipse of 25 February 1952.** *Journal of Atmospheric and Terrestrial Physics*, Lon 9(1):36–44, July **1956.** 6 figs., 3 tables, 5 refs., 7 eqs. **DWB**—To explain the changes i E layer about 50% of the ionizing radiation must have originated in bright spots near east and west limbs of the sun, the remainder from a uniformly radiating disk. Calculat from Khartoum and Ibadan data give for the effective recombination coefficients in the E F1 layers values of 1.2 and 0.65×10^{-8} cm³/sec. This is checked by day to day changes o ionizing radiation at Khartoum from Feb. 15–March 6. It is also found that during tot the ionizing radiation was completely cut off. *Subject Headings:* **1. Recombination proce 2. Eclipse effects on ionosphere.**—*C.E.P.B.*

7.11–163 551.510.535

Rastogi, R. G., **Two types of development of the E2 layer at Ahmedabad.** *Journal of Atmospheric and Terrestrial Physics*, London, 9(1):71–72, July **1956.** 2 figs., 6 refs. **DWB**—The E2 layer appears about 150 km before ground sunrise, but sometimes occurs at night. It is due to photoionization, and grows with increasing solar altitude. There may be another layer between E2 and normal E. Occasionally E2 rises about 11 h LMT to join F1 or form a ledge in it. Photos of recordings illustrate these two types. *Subject Headings:* **1. E2 layer Ahmadabad, India.**—*C.E.P.B.*

7.11–164 551.510.535:621.396.11

Saxton, J. A., **Ionospheric scattering at V.H.F. Mechanism of propagation: practical application to long-range communication.** *Wireless World*, London, 62(1):36–40, Jan. **1956.** 6 figs. **DLC**—Scattering by irregularities of refractive index is described. Turbulence causes scattering in the troposphere which is chiefly effective in 500–5000 Mc/s. Transmission up to 1000 km on 25–60 Mc/s may be due to forward scattering by ionic clouds in the E-region or to reflection from ionized meteor trails or both. The characteristics of such signals and their use in communication are discussed. *Subject Headings:* **1. Radio wave scattering 2. Ionospheric scattering.**—*C.E.P.B.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Dynamic met.** (Panofsky), 7.11–10; **Numerical forecasting with barotropic model** (Dady), 7.11–138; **Constant absolute vorticity trajectories** (Maine, Pierrehumbert), 7.11–141; **Instability waves** (Foldvik), 7.11–173; **Static stability and disturbances** (Reiser), 7.11–176; **Selective absorption in radiational heat exchange** (Feĭgel'son), 7.11–186.

7.11–165 551.511:551.543:532.593

Abdullah, Abdul Jabbar, **A note on the atmospheric solitary wave.** *Journal of Meteorology*, 13(4):381–387, Aug. **1956.** 2 figs., 13 refs., 42 eqs. **DWB**—An attempt is made to show that a single elevation of permanent type may exist in a two-layer atmosphere at the interface between the two layers. The compressibility of the air, friction, the earth's rotation, and its spherical shape are neglected. It is assumed that the free surface of the upper layer remains undisturbed at all times, and that the hydrostatic relation holds in the upper layer when the lower layer is disturbed. It is found that, under these simplifying assumptions, internal solitary waves may exist in the atmosphere. The shape of these waves and the conditions attending their formation are found to be identical with those of shallow water waves as given by KELLER. *Subject Headings:* **1. Atmospheric waves 2. Solitary wave theory.**—*Author's abstract.*

7.11–166 551.511:551.555.6:551.509.3(54)

Bose, B. L. (*Met. Off., Dum Dum, Calcutta*), **On 'isobaric divergencies' in nor'wester situations over Gangetic west Bengal and neighbourhood.** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(4):316–326, Oct. **1955.** 9+figs., 5 refs. **DWB, DLC**—Relative divergence pattern 1000–850, 850–700, 1000–700, 1000–500 and 700–500 mb has been determined for nor'westers with comparatively unfavorable synoptic situation, for nonoccurrence of nor'westers with comparatively favorable synoptic situations and for normal cases of nor'westers with the usual synoptic situations. Charts showing the relative divergence expressed in units of 10^{-2} hr^{-2} and the area of thunderstorm are reproduced. During the nor'wester season the thermal structure is usually so complex that weather developments cannot be inferred always from the charts alone. The role of the middle layers of the lower troposphere and of upper level convergence in the development and inhibition of nor'westers is described. Thunderstorms seem to occur over the region where the mean divergence between the uppermost and lowermost layers of 1000–500 mb layer is less than the divergence at the 700 mb layer. *Subject Headings:* **1. Divergence 2. Northwesters 3. Synoptic studies 4. India.**—*I.L.D.*

7.11–167 551.511:531.51:551.5

Donn, William L.; Milic, Patricia L. and Brilliant, Renee, **Gravity waves and the tr... sea breeze.** *Journal of Meteorology*, 13(4):356–361, Aug. **1956.** 6 figs., 2 tables, 7... **DWB**—Records of a microbarovariograph at Guantanamo Bay, Cuba, Aug. 1952, are ana... for waves of 5–40 min for each hour. Before 11 h E.S.T. waves of 5 min predominat... creasing to 10 min at 11 h and 22 min at 14 h. From 13 h through 18 h the mean len... 17 min. A sea breeze of 9–13 kn from SE occurred daily beginning 11–12 h and showed si... fluctuations. Temperatures and upper winds are considered. The waves are not conve... but are due to internal wave motion below gravity waves aloft. A theoretical model ... tropical sea breeze is shown and discussed. *Subject Headings:* **1. Gravity waves 2. ... breezes 3. Cuba.**—*C.E.P.B.*

7.11–168 551.511:5...

Garcia, R. V. (*Univ. Calif., Los Angeles*), **Barotropic waves in straight parallel flow ... curved velocity profile.** *Tellus*, Stockholm, 8(1):82–93, Feb. **1956.** 9 figs., 5 refs., 11... **DLC**—The paper contains a study of the dynamics of two-dimensional straight parallel ... with a continuously curved profile. The differential equation for the stream-function ... neutral wave disturbance is used as an analytical tool to investigate the properties and ... evolution of waves having a certain initial configuration of the flow. The behavior o... waves is explained by using an extension of the method applied by Holmboe (1953) i... study of the Kelvin and Rayleigh waves. In order to do that, the problem has been approa... from a point of view which deviates somewhat from the customary treatment. The me... is first illustrated by a model with a hyperbolic tangent profile (*Th*-flow), which is show... have a very simple analytical solution for the stationary wave L_s. The form of the solu... makes it possible to interpret it for other wave lengths ($L \gtrless L_s$) as a forced stationary v... which is the resultant of a non stationary physical wave and a Rayleigh wave induced by ... proper infinite sliding vorticities at the central level. When this foreign field is removed f... the solution, the remaining field which now is a physically possible initial configuration of ... flow, will propagate with different speed from level to level. As the tilt develops the w... will begin to amplify if $L > L_s$, and it will be damped if $L < L_s$. So the sfationary wave re... sents the transition from short stability waves to long instability waves as had been anticipa... by Fjørtoft. The method is then extended to more general types of profiles. Some ge... results on the conditions for the existence of stationary waves, which were proved or anticipa... by Rayleigh (1880), Fjørtoft (1950) and Höiland (1951), are given a unified treatm... It is finally shown that, if a system has stationary waves, they represent the transition fl... damped to amplified waves. If the number of stationary waves is even, both the shor... and the longest waves are damped waves, and the intermediate intervals of the spectrum ... alternate bands of amplified and damped I-waves. If the number of stationary waves is o... the longest waves in the spectrum are amplified. *Subject Headings:* **1. Barotropic the... 2. Wave motion.**—*Author's abstract.*

7.11–169 551.511:551.54...

Milic, Patricia Langwell, **Criteria for vertical transfer of energy.** *Journal of Meteorol...* 13(4):410–412, Aug. **1956.** 2 refs., 15 eqs. **DWB**—Oscillations at an interface aloft ... small but are occasionally detected at ground level. A periodic solution of the perturbat... equations is given which permits the transfer of energy through a large height interval w... long waves travel at a speed close to that of the wind. *Subject Headings:* **1. Vertical trans... of energy 2. Pressure waves.**—*C.E.P.B.*

7.11–170 551.511:551.551:551.558.1:53...

Morton, B. R.; Taylor, Sir Geoffrey and Turner, J. S., **Turbulent gravitational convect... from maintained and instantaneous sources.** *Royal Society of London, Proceedings, Ser.* ... 234(1196):1–23, Jan. 24, **1956.** 9 figs., 3 tables, 11 refs., 27 eqs. **DWB**—Theories of conv... tion from maintained and instantaneous sources of buoyancy are developed, using meth... which are applicable to stratified body fluids with any variation of density with height; detai... solutions have been presented for the case of a stably stratified fluid with a linear dens... gradient. The three main assumptions involved are (i) that the profiles of vertical veloc...

l buoyancy are similar at all heights, (ii) that the rate of entrainment of fluid at any height proportional to a characteristic velocity at that height, and (iii) that the fluids are incompssible and do not change volume on mixing, and that local variations in density throughout motion are small compared to some reference density. The governing equations are rived in nondimensional form from the conditions of conservation of volume, momentum and oyancy, and a numerical solution is obtained for the case of the maintained source. This ds to a prediction of the final height to which a plume of light fluid will rise in a stably atified fluid. Estimates of the constant governing the rate of entrainment are made by nparing the theory with some previous results in uniform fluids, and with the results of new periments carried out in a stratified salt solution. For the case of an instantaneous source buoyancy there is an exact solution; the entrainment constant is again estimated from oratory results for a stratified fluid. Finally, the analysis is applied to the (compressible) mosphere, by making the customary substitution of potential temperature for temperature. edictions are made of the height to which smoke plumes from typical sources of heat should e in a still, stably stratified atmosphere under various conditions. *Subject Heading:* **1. Turlence theory.**—*Authors' abstract.*

7.11–171 551.511:551.547:551.557

Saltzman, Barry (*M.I.T.*), **Note on simple assumptions regarding the baroclinic structure the atmosphere.** *Tellus*, Stockholm, 7(3):385–387, Aug. **1955.** table, 3 refs., 2 eqs. **DLC** The author points out "some observed short-comings of the evaluation of the baroclinic term $\int_0^{2\pi} \overline{C'_T C'_R}\, d\theta$ (in the equation of LORENZ

$$\tau = \frac{p_0}{g} R^2 \int_0^{2\pi} \overline{C_T C_R} + \frac{p_0}{g} R^2 \int_0^{2\pi} \overline{C'_T C'_R}\, d\theta,$$

here τ local momentum transport)" by means of an assumption regarding the vertical variaon of the wind as compared with a "three dimensional" evaluation of the baroclinic conibution by means of data at five levels of the atmosphere. *Subject Heading:* **1. Baroclinic elds.**—*I.L.D.*

GENERAL CIRCULATION

See also: **Improved barotropic model** (Bolin), 7.11–137; **Numerical forecasting with barotropic model** (Dady), 7.11–138; **Zonal index** (Müller-Annen), 7.11–145; **Prolonged heat wave** (Andrews), 7.11–198; **Weather and circulation, N. Hemisphere** (Müller-Annen), 7.11–289.

7.11–172 551.513:551.543.4:551.553.4:551.583.14

Kraus, E. B., **Secular changes of the standing circulation.** *Royal Meteorological Society, Quarterly Journal*, 82(353):289-300, July **1956.** 4 figs., 10 tables, 13 refs. **DWB**—Pressure ifferences (1911–40)–(1881-1910) at Indian stations in July show an increase of the S-N radient and intensification of the N. Indian summer monsoon low, with corresponding changes f rainfall. The Jan.–July pressure amplitude over N. India and Siberia has increased steadily ince 1911; in Siberia this is mainly due to a large rise of Jan. pressure. This is associated vith wind changes which have caused colder winters and hotter summers in the Far East nd milder winters and cooler summers in Europe. There has been increased transport of varm air into the Arctic causing a marked retreat of glaciers and sea ice; in the Antarctic he glacial changes are smaller or absent. A possible mechanism of climatic change due to eduction in the zonal circulation is put forward. *Subject Headings:* **1. Atmospheric circulation rends 2. Pressure trends 3. India.**—*C.E.P.B.*

7.11–173 551.513.2:551.511

Foldvik, Arne, **Computations of the frequency of flight for instability waves in two sliding ayers with internal gravitaional stability.** *Norske Videnskaps-Akademi i Oslo, Institutt or Vaer- og Klimaforskning, Report*, No. 3, **1955.** 6 p. 3 tables, 2 refs., 8 eqs. **DWB**—In papers from 1943 and 1948, HÖILAND showed that gravitational stability combined with a

concentrated shear would give rise to long instability waves. In this note the imag part of the complex wave velocity (γ) is computed for values of the gravitational sta corresponding to atmospheric conditions. In the case of infinite wave-length the freq equation is discussed in special cases, and some maximum values of γ are computed. *S Headings:* **1. Instability waves 2. Gravitational stability.**—*Author's abstract.*

7.11–174 551.513.2:55

Touart, C. N., **Jet streams: fact and fiction.** *Air University Quarterly Review*, Ma Air Force Base, Alabama, 7(3):75–88, Winter **1954/1955,** figs., 6 refs. **DLC**—The au who is Chief of the Atmospheric Analysis Laboratory at AFCRC, tries to correct some popular misconceptions regarding the jet stream, and presents several charts of North An and cross sections of the wind field to show extreme variability in winds if detailed struct known, whereas with limited data a simple but misleading picture may be drawn. Th stream is likened to an anticyclone in its indefinite boundaries but fairly definite axis. Postscript corrects the impression which some readers gained that the jet stream is of no tional value. Highest verified jet stream wind value is 275 mph over a distance of 28 tropopause. *Subject Headings:* **1. Jet stream structure 2. Extreme wind speeds aloft.**—

7.11–175 551.513.7:55

Gherzi, Ernesto, **Periodic fluctuations of the Eurasian high and the Oceanic low pres areas.** St. Louis Univ. Inst. of Technology, Contract AF 19(604)-1294, Scientific Re No. 1, Oct. 18, **1955.** 16 p. 3 figs., 3 tables, 2 refs.—An analysis of a 3 year series o historical weather maps (1946–1947; Jan.–June 1934; July–Dec., 1952) seems to sh continuous and almost parallel oscillation of the borders of the oceanic (Pacific and Atla lows. Secondary waves of a period of 3 days are prevalent. The atmospheric high r connecting the polar and subtropical highs have a prevailing duration of 3 days. The t of the maximum pressure over the Eurasian plateau shows a principal oscillation of 13 days, which is also found in the westward extension (lat. zone 40° to 50°N) of the area of high pressure system. The maps for 10 winters (Dec., Jan., Feb., 1930–37, 1946–47) considered. *Subject Headings:* **1. Atmospheric circulation oscillations 2. Anticyclonic d tion.**—*A.A.*

ATMOSPHERIC DISTURBANCES

See also: **Fluctuations of Eurasian high and Oceanic low pressure** (Gherzi), 7.11–175; **Föhn, S. Crimea** (Kir'ianov), 7.11–223; **Interesting thunderstorm cloud** (Alberti), 7.11–245; **Temp. diff. in S. Tyne Valley** (Richardson), 7.11–279; **Electric field and radar echo in thunderstorm** (Reynolds, Brook), 7.11–300; **Tornado and ball lightning** (Malsch), 7.11–303; special bibliography on **Tropical cyclone theory,** p. 1405.

7.11–176 551.515.11:551.515.71:551

Reiser, H., **Über den Einfluss der statischen Stabilität auf die Entwicklung von Störung** [On the influence of static stability on the development of disturbances.] *Meteorologi Rundschau*, 9(7/8):113–120, July/Aug. **1956.** 12 figs., 5 refs., 16 eqs. **DWB**—For an in state as simple as possible but capable of development (baroclinic base current with superp barotropic disturbance) time changes of the geopotential field are determined with the l of the quasigeostrophic equations. From these, forecasts of the initial stage of the devel ment process (cyclo- or anticyclogenesis) are deduced. The modification of the results variation of the static stability and the dependence of the intensity of development on wave length are discussed. *Subject Headings:* **1. Cyclogenesis 2. Anticyclogenesis 3. S bility.**—*Trans. of author's abstract.*

7.11–177 551.515.11:551.515

Sawyer, J. S., **The vertical circulation at meteorological fronts and its relation to fro genesis.** *Royal Society of London, Proceedings, Ser. A*, 234(1198):346–362, Feb. 21, 19 7 figs., table, 9 refs., 12 eqs. **DWB**—It is shown from air trajectories (2000 ft, 700, 500 300 mb) at active well marked fronts that horizontal confluence through the whole or lo half of the troposphere tends to increase the thermal gradient between two air masses.

e of confluence is discussed theoretically, and "it is shown that the characteristic upward otion of the warm air and sinking of the cold air must take place, but the calculated upward otion of the warm air is insufficient to account for the observed rainfall unless the effect the temperature field of the release of latent heat in the cloudy air is taken into account. he characteristic slope of the frontal surfaces also appears to arise from the vertical circulation hich also tends to give the strongest horizontal temperature gradient near the ground and in e upper troposphere." Frontogenesis is associated with most active fronts, which probably e their characteristic features to it. *Subject Headings:* **1. Frontal circulation 2. Vertical otion at fronts.**—*C.E.P.B.*

7.11–178 551.515.127:551.509.317

§Kleinschmidt, E., Jr. (*Max Planck-Inst. for Storm Forecasting, Göttingen*), **Die Entstehung ner Höhenzyklone über Nordamerika.** [Origin of a high level cyclone over North America.] *ellus*, Stockholm 7(1):96–110, Feb. **1955.** 12 charts, 8 diagrs., table, 7 refs., 7 eqs. **DLC**—he deep high level cyclone of April 6–7, 1951 over central part of North America is analyzed namically and synoptically by means of cross sections, surface synoptic and isentropic rticity charts. It is shown that the existence of the high-level cyclone depends on masses increased potential vorticity in the upper troposphere. The tropopause funnel does not iginate as a sinking of the stratosphere in a vortex, but as a sharp intrusion of low polar ratospheric air which has high vorticity and becomes involved in the cut-off portion of the per low. A nonconservative force, parallel to and south of the jet stream, is found to be the mediate cause of the cut-off process. *Subject Headings:* **1. Upper level cyclogenesis 2. Synptic-aerological studies 3. Tropopause funnels.**—*M.R.*

7.11–179 551.515.3:551.55.8

De Jong, J. J. G., **Ontstond een windhoos in gebied waar twee buien elkaar ontmoetten?** Did a tornado arise in a region where two squalls came together?] *Hemel en Dampkring*, he Hague, 53(8/9):168-170, Aug./Sept. **1955.** 3 figs (incl. photos), 2 refs. **DWB, DLC**—uring a squall which moved over southwestern Friesland, conditions forced the formation of a rnado which caused great damage at Huis ter Heide. Evidence is presented that two squalls raveling southwest and west and encountering each other produced powerful winds. This henomenon agrees with the theory of BLEEKER and DELVER that the probability of the ccurrence of powerful tornadoes which originate in micro-depressions is very great in regions etween the squalls. *Subject Headings:* **1. Tornado theory 2. Tornadoes associated with qualls 3. Huis ter Heide, Netherlands.**—*I.L.D.*

7.11–180 551.515.3(763,767)

Kaplan, Henry G. (*W.B.A.S., LaGuardia Field, N. Y.*), **Analysis of the Arkansas-Louiiana tornado situation of Jan. 3, 1949.** U. S. Weather Bureau, [1955?]. 6 p. fig., 5 refs. hotostat of typescript. **DWB**—Analysis of tornado which hit El Dorado, Ark., Warren, rk., and Haynesville, La., on Jan. 3, 1949 (*ca* 1745C). Shreveport and Nashville RAOB oundings for 0300Z on Jan. 4, 1949, are presented to show air of tropical maritime origin ith warm front surface at 900 mb (Nashville) and high dew points up to 575 mb, and a dry yer from 850 to 700 mb at Shreveport. At 750 mb a dew point difference of 11°C occurred etween the two stations. The mechanism of tornado formation is by intrusion of a tongue f dry air into mT(moist) air, and a nearby thunderstorm to provide rapid cooling of moist yers by snow falling through them. *Subject Headings:* **1. Tornado analysis 2. Arkansas . Haynesville, La.**—*M.R.*

7.11–181 551.515.3

§McLean, George S. and Rados, Robert M. (both, *U. S. A. F. Cambridge Res. Center*), **roject Jet Stream observation of a small-scale high-level vortex.** *American Meteorological Society, Bulletin*, 36(9):469–474, Nov. **1955.** 6 figs., table. **DWB, DLC**—An intense cyclonic ortex over Florida at 36,000 ft is evidenced by Project Jet Stream's B-47 flight observations. Aircraft winds, temperatures, and cloud observations are presented with analysis of synoptic harts. A weak jet stream on the west side of the vortex and strong horizontal shear are bvious. The scarcity of upper air observations could cause an oversight of similar situations

which are not reflected at the surface level. *Subject Headings:* **1. Project Jet Stream 2. clonic vortexes 3. Florida.**—*Authors' abstract.*

7.11–182 551.515.3(766):55

Montgomery, Floyd C., **Tornadoes at Blackwell, Okla., May 25, 1955.** *Monthly We Review*, Wash., D. C., 83(5):109, May **1955. DWB**—Report of 2 tornadoes by observer was in storm cellar during the passage of this, the fourth tornado situation he had experie at Blackwell. Hailstones 2½ to 2¾ in. in diameter were measured. The wind was dead at his cellar though the first storm was 9 blocks east, and the second, smaller one, 6 blocks In both cases a roar like a freight train was heard, and in the top of the first funnel "fire l child's 4th of July pinwheel was distinctly observed." *Subject Headings:* **1. Tornado servation 2. Blackwell, Okla.**—*M.R.*

7.11–183 551.515.3:551.541

Newstein, Herman (*Severe Local Storm Res. Unit, U. S. W. B.*), **Tornado-pressure line situation of March 18, 1954.** *Monthly Weather Review*, 82(9):255–256, Sept. **1954. MH-BH**—The results of an analysis of eight pressure jump reports, associated with tornadoes of March 18, 1954 in eastern Kansas are presented. Isochrones of pressure line with tornado locations are shown on maps. The remarkable agreement in time and between tornadoes and isochrones is shown graphically. *Subject Headings:* **1. Pressure 2. Tornado location 3. Eastern Kansas.**—*I.L.D.*

7.11–184 551.515.4(548.7) 551.577.38(5

Jackson, G. C., **Overseas notes [on] Ceylon.** *Weather*, 11(8):257–258, Aug. **DWB**—Notes on the weather in 1956. Storms at Kandy and Peradeniya on March 10 14 are described. Ceylon this year is suffering from "one of the worst droughts in memo *Subject Headings:* **1. Thunderstorms 2. Droughts 3. Ceylon.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Processing actinometric data** (Lopukhin), 7.11–106; **Min. air temp.** (Kawamura), 7.11–200; **Negative oxygen ions in upper atmos.** (Branscomb, Smith), 7.11–304; **Auroras** (Omholt), 7.11–305.

7.11–185 551.5

Hinzpeter, Hans, **Einfache Rechnungen und Messungen zur Global- und Himm strahlung II.** [Simple measurements and calculations of global and sky radiation, Pt. *Zeitschrift für Meteorologie*, Berlin, 10(4):100–110, April **1956.** 6 figs., 12 tables, 14 r 8 eqs. **DLC**—In this part the formulas developed in Pt. 1 (*Ibid.*, 9(10):308–315, Oct. 1 *see item* 7.6–134, June 1956, *MAB*) are used to calculate diffuse sky radiation for diffe degrees of turbidity, different zenith distances and different wave lengths. The res compare satisfactorily with observations, except that the calculated values are too h This is not due to the assumption of dust-content constant with height. *Subject Head* **1. Spectral distribution of sky radiation.**—*C.E.P.B.*

7.11–186 551.521.3:551.

Feĭgel'son, E. M., **Uchet izbiratel'nogo pogloshcheniia v teorii luchistogo teploobmen atmosfere.** [Calculation of selective absorption in the theory of radiational heat excha in the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:249–260, 1 5 figs., 3 tables, 4 refs., 37 eqs. **DLC**—An investigation of the radiational heat exchang long wave radiation in the earth's atmosphere on the assumption of a different spectrun extinction for medium and large values of the coefficients of extinction. The role of l coefficients in the upper layers of the atmosphere is clarified separately. *Subject Headi* **1. Radiation heat exchange 2. Extinction coefficient 3. Atmospheric absorption.**—*Tr of author's abstract.*

7.11–187 551.521.3:535.34:546.17

Tanaka, Yoshio (*U. S. A. F., Cambridge Res. Center, Mass.*), **Absorption spectrum of ogen in the region from 1075 to 1650 A.** *Optical Society of America, Philadelphia, Journal,* 8):663–664, Aug. **1955.** fig., 2 tables, 12 refs. **DWB, DLC**—Using the argon continuum a background, the absorption spectrum of N_2 was reinvestigated in the region between 5 and 1650 A. None of the absorption of the region reported by WEISSLER was observed. Lyman-Birge-Hopfield absorption bands were extended up to $v'=13$. Below 1130 A, r bands were observed, three of which might be explained as the first three bands of transi- n $C^3\Pi_u \leftarrow x^1\Sigma_g^+$. *Subject Headings:* **1. Absorption spectra 2. Nitrogen bands.**—*Author's tract.*

7.11–188 551.521.31

Fesenkov, V. G., **O iarkosti dnevnogo bezoblachnogo neba pri sfericheskoĭ zemle.** [The ghtness of daytime cloudless sky for a spherical earth.] *Akademiia Nauk, SSSR, Doklady,* (5):845–847, April 1, **1955.** table, refs., eqs. **DLC**—The present theory of daytime bright- s of the sky limited to a flat earth area is not applicable to points of the sky close to the izon especially at low solar altitude and does not connect the brightness of the daytime sky h that of the twilight sky. Proceeding from the assumption that atmospheric density inishes with altitude according to a simple empirical formula and that the alternation of t is caused by simple diffusion and taking into account only first order diffusion light, the llowing equation is given for expressing the brightness of the sky for all points:

$$\frac{B}{E} = \frac{F(\vartheta)}{2\mu \int_{\mu}^{\pi} f(\vartheta) \sin \vartheta d\vartheta} p^{-m_p} \frac{p^{m_z} - p^{m\varphi}}{m\varphi - m_2} m^2.$$

bject Heading: **1. Sky brightness.**—*I.L.D.*

7.11–189 551.521.32:551.521.61:551.571

Gates, David M., **Infrared determination of precipitable water vapor in a vertical column the earth's atmosphere.** *Journal of Meteorology,* 13(4):369–375, Aug. **1956.** 8 figs., ables, 6 refs. **DWB**—The total precipitable water in the path of solar radiation is deter- ned from transmission of water vapor absorption bands at 0.96, 1.1 and 1.4μ, determined a Perkin-Elmer infrared spectrometer at Denver and at Mt. Evans (14,200 ft) and reduced vertical incidence. F. E. FOWLE's (1915) calibration was redetermined using radiosonde ta. Measurements in Nov.–Dec. 1951 over the entire absorption bands and on specified dinates are set out, the ordinate method being the more accurate, especially on the 1.1μ nd (ϕ), as well as quicker. On clear autumn days the precipitable water was about 4 mm ove Denver and 2 mm above Mt. Evans. On warm summer days it was about 16 mm at enver. *Subject Headings:* **1. Infrared absorption spectrum 2. Precipitable water vapor.** *C.E.P.B.*

7.11–190 551.521.4:535.33

Bates, D. R. and Moiseiwitsch, B. L., **Origin of the Meinel hydroxyl system in the night rglow.** *Journal of Atmospheric and Terrestrial Physics,* London, 8(6):305–308, June **1956.** ble, 18 refs., 13 eqs. **DWB**—BATES and NICOLET (1950) and HERZBERG (1951) suggested at the Meinel hydroxyl system is due to $H+O_3 \rightarrow OH+O_2$, the hydroxyl molecule being brationally excited. Arguments against this are considered and rejected. *Subject Heading:* **Night airglow spectrum.**—*C.E.P.B.*

7.11–191 551.521.4:535.33

Dufay, Maurice and Dufay, Jean (both, *Lyon Obs.*), **Contribution à l'étude du spectre a ciel nocturne dans le violet et le proche ultraviolet.** [Contribution to the study of the ectrum of the night sky in the violet and in the near ultraviolet.] *Annales de Géophysique,* aris, 11(2):209–213, April/June **1955.** table, 9 refs. **DLC**—Analysis of night airglow ectra between 3400 Å and 4000 Å is discussed under following headings: Herzberg bands, cond Herzberg system and Broida-Gaydon system, N_2^+ bands, Vegard-Kaplan N_2 bands, c. Data are included. *Subject Heading:* **1. Night airglow spectrum.**—*M.R.*

7.11–192 551.521.4:5

Hunten, D. M. (*Univ: of Saskatchewan, Saskatoon, Canada*), **Excitation of the sc D lines in night-glow.** *Physical Review*, N. Y., 97(4):1178, Feb. 15, **1955.** 3 refs. D It is concluded that resonant scattering cannot be important in exciting of night airglo may be important in twilight. *Subject Headings:* **1. Night airglow 2. Sodium D line.**—

7.11–193 551.521.61:54

Plass, G. N., **The influence of the 15μ carbon-dioxide band on the atmospheric infr cooling rate.** *Royal Meteorological Society, Quarterly Journal*, 82(353):310–324, July 9 figs., table, 22 refs., 8 eqs. **DWB**—The upward and downward radiation flux and c rate are calculated for the 15μ band of carbon dioxide. Results are obtained for three diff carbon-dioxide concentrations from the surface of the earth to 75 km, and for six frequen tervals covering the band. The infra-red absorption measurements of Cloud (1952) are for calculations, on a high-speed electronic computer, by a method which takes account pressure and Doppler broadening, the overlapping of the spectral lines, and the vari of the intensity and half-width of the spectral lines with temperature and pressure. numerical integration is performed over intervals that are never larger than 1 km and av values over layers are not used. The cooling rate for the present atmospheric carbon-di concentration is greater than 1°C/day from 24 km to 70 km and is greater than 4°C/day 38 km to 55 km. The sum of the ozone and carbon-dioxide cooling rates is greater than day from 33 km to 57 km and agrees reasonably well with the heating due to ozone absor The results for different carbon-dioxide concentrations indicate that the average temper at the surface of the earth would rise by 3.6°C if the carbon-dioxide concentration were do and would fall by 3.8°C if the carbon dioxide concentration were halved, on the assum that nothing else changed to affect the radiation balance. *Subject Headings:* **1. Carbon di absorption bands 2. Infrared radiation cooling.**—*Author's abstract.*

7.11–194 551.5

Crawshaw, J. K. and Elliot, H., **Search for a sidereal variation of the cosmic ray inte at high energies.** *Physical Society of London, Proceedings, Ser. A*, 69(2):102–109, Feb. 1, 3 figs., 5 tables, 10 refs., 3 eqs. **DWB**—Air showers were recorded at Manchester Oct. 1 Oct. 1953 by coincidence pulses of 4 counters at corners of a quadrilateral 150×300 m. shower frequencies were analyzed harmonically. No evidence for a sidereal daily vari was found. A solar daily variation of 10^{17} ev showers was found with amplitude 19% maximum about 13 h, but no known process can account for so large a variation. *Su Heading:* **1. Cosmic ray variations.**—*C.E.P.B.*

AIR TEMPERATURE

See also: **Temperature: its measurement and control** (American Inst. of Physics), 7.11–2; **Temp. and life** (Precht et al.), 7.11–11; **Physiological experiment in medical met.** (Pichotka), 7.11–96; **Hourly dry- and wet-bulb temp.** (Shellard), 7.11–116; **Winter rain gage** (Zobel, Reinecke), 7.11–132; **Nocturnal temp. profile over bare soil, 7.11–280; Temp. and humidity over plants** (Berger-Landefeldt), 7.11–281.

7.11–195 551.524:159

Bonacina, L. C. W., **Puzzles in thermal sensation.** *Weather*, 11(8):269, Aug. 1 **DWB**—Suggests that temperatures of 40–50° feel cold in spring but warm in winter, prob a psychological effect, and that in winter they are depressing. *Subject Heading:* **1. Ther sensation.**—*C.E.P.B.*

7.11–196 551.524.32:517.5

Craddock, J. M., **The representation of the annual temperature variation over cer and northern Europe by a two-term harmonic form.** *Royal Meteorological Society, Quar Journal*, 82(353):275–288, July **1956.** 9 figs., 6 tables, 13 refs., 4 eqs. Also issued as G *Britain. Meteorological Research Committee, M.R.P.*, No. 915, April 29, **1955.** (*See* 6.11–232, Nov. 1955, *MAB.*) **DWB**—The long-period annual variation of temperatur

stations in central and northern Europe is analyzed from 5-day means for the first 4 harnics. The first two represent nearly all the annual variation, except for about ten 5-day iods which had the same anomaly at all or nearly all stations. These singularities persist en independent periods are examined, the most obvious is a positive anomaly in late May l early June. Charts show amplitudes and phases of the first two harmonics. *Subject adings:* **1. Annual temperature variation 2. Harmonic analysis 3. Temperature sinarities.**—*C.E.P.B.*

7.11–197 551.524.35

Namias, Jerome (*U. S. W. B., Wash., D. C.*), **Persistence between monthly temperature omalies and their first 5-day components.** U. S. Weather Bureau, July **1955.** 4 p. fig., refs. **DWB**—Remarkable similarity between predicted temperature anomalies for U. S. 30-day period, and those for the first 5-day period of the month, is believed to be due to rsistence or recurrence of synoptic patterns (appearing in the first week) during the remainder the month or an appreciable part thereof. The statistical test shows month-to-month riation in percentage of stations in U. S. in which temperature anomaly did not change by ore than one of the 5 classes, from first 5-day period of a month to the month as a whole for ch month from 1945 through 1954. Assuming an expected 60% success, actual successes –80% (or more in summer) are believed to show extent of persistence and usefulness of this enomenon as a forecast tool for the 30-day forecasters. *Subject Headings:* **1. Temperature rsistence anomalies 2. Long range forecasting 3. United States.**—*M.R.*

7.11–198 551.524.36:551.513.7

Andrews, James F. (*U. S. W. B., Wash., D. C.*), **The weather and circulation of July 955: a prolonged heat wave effected by a sharp reversal in circulation.** *Monthly Weather eview*, Wash., D. C., 83(7):147–153, July **1955.** 7 figs., table, 5 refs. **DWB, DLC**—Features the July 1955 circulation were retrogression of the June blocking high from eastern Canada Alaska, formation of a trough over Davis Strait and a blocking high over the North Sea. he resulting weather was unusually hot over the U. S. east of the Rockies, in Alaska, England nd Scandinavia. (June was cold all over the U. S.) Cold weather prevailed in July along he West Coast. In spite of the continuous and widespread heat in central and eastern U. S. at broke records in major cities, no extreme temperature records were broken, except in laska. *Subject Headings:* **1. Atmospheric circulation anomalies 2. Hot summers 3. Heat ave—July 1955 4. Eastern United States.**—*M.R.*

7.11–199 551.524.36(547)

Record temperature in Bombay and severe heat wave in coastal Saurashtra, South ujarat and the North Konkan in April 1955. *Indian Journal of Meteorology and Geophysics*, ew Delhi, 6(3):256, July **1955. DLC**—The maximum temperature of 105°F at Bombay Colaba) on April 18, 1955, was an all time record in a period of 100 years; a temperature of 06°F was recorded on Santacruz Airport on the same date. These temperatures were part f a heat wave that affected coastal Saurashtra, South Gujarat and the North Konkan during pril 16–20. *Subject Headings:* **1. Extreme temperature 2. Heat waves 3. Bombay, India.**—*I.L.D.*

7.11–200 551.524.36(521.22):551.521.2

Kawamura, A., **On the minimum air temperature around Tateno in winter night.** *Journal f Meteorological Research*, Tokyo, 7(5):309–322, July **1955.** 10 figs., 6 tables, 11 refs. In apanese; English summary p. 309. **DWB**—It is well-known that the Aerological Observatory, Tateno, and its neighborhood constitute one of the lowest air temperature regions in the Kantō District in the winter season. In order to clarify this characteristic, serial observations were carried out with the aid of temporary observational networks from Dec. 22, 1953 through March 31, 1954, and the results obtained are given. From the 10-day mean isoline, it follows hat the lowest temperature region agrees well in its direction with the ridge of the plateau nder consideration. The temperature difference between the ridge and the surrounding ower area is 3°C or so; as has been previously pointed out, the larger difference is apt to occur

on clear, calm nights and the smaller on cloudy, windy nights. The mechanism of noct cooling is too complicated to draw a definite conclusion, but it seems that the water area water content in soil plays a very important role in this problem. In the present cas influence of Lake Kasumigaura and also the paddy field, lower than 20 m m.s.l. in h must be mentioned as considerably important factors. *Subject Headings:* **1. Minimu temperatures 2. Nocturnal cooling 3. Tateno, Japan.**—*Author's abstract.*

7.11–201 551.524.36

*Rocznik, K., **Häufigkeit von Tagen mit verschiedenen Temperaturstufen in Regen 1946–1955.** [Frequencies of days with different temperatures in Regensburg, 1946 *Meteorologische Rundschau*, 9(7/8):150–151, July/Aug. **1956.** 2 tables. **DWB**—Mo frequency tables are given for daily mean temperatures < -10 to $> 25°C$ by 5° steps. Fi are also given for winters of 1946/7 and 1947/8, summers 1947 and 1948, and Feb. 195 1953. *Subject Headings:* **1. Temperature frequencies 2. Regensburg, Bavaria.**—*C.E.P.*

7.11–202 551.524.36:551.5

Spreen, William C., **Empirically determined distributions of hourly temperat** *Journal of Meteorology*, 13(4):351–355, Aug. **1956.** fig., 8 tables, 4 refs. **DWB**—A grap method of determining the percentiles of monthly hourly surface temperatures from the temperature and mean daily range is developed, using data for 9 widely distributed stat A working example is given. The average error in the value of a given percentile is 1.6°F most frequent 0.1–1.0°F. The diagram is tested by 11 other stations. *Subject Head* **1. Temperature frequencies 2. Computation charts.**—*C.E.P.B.*

7.11–203 551.524.37

Rogers, Peter, **Severe winters.** *Weather*, 11(8):268, Aug. **1956. DWB**—In Jan. the Thames was effectively frozen over throughout London. A sheep was roasted and set up on the ice. *Subject Headings:* **1. Severe winters 2. London, Eng.**—*C.E.P.B.*

7.11–204 551.5

Grober, K. W., **Die interdiurne Veränderung der Temperatur in der freien Atmosph klimatologisch betrachtet.** [The interdiurnal variation of temperature in the free atmosp considered climatologically.] *Zeitschrift für Meteorologie*, 10(5):137–142, May **1956.** 5 tables, 9 refs. **DLC**—In recent investigations the interdiurnal variation of tempera (I.V.) has been taken from relative topography maps, which may lead to false results. is shown by comparison of figures for different places. Revised figures and time-he isolines are given for Greifswald and Dresden, 0.5–18 km, and discussed, showing the influ of the Baltic. The I.V. is important for determining vertical air movement and for opera of jet aircraft. *Subject Heading:* **1. Interdiurnal upper air temperature variations.**—*C.E.*

7.11–205 551.524.7:551.557:551.596.1

*Murgatroyd, R. J., **Wind and temperature to 50 km. over England. Anomalous so propagation experiments, 1944–45.** *Great Britain. Meteorological Office, Geophysical Mem* No. 95, **1955.** 30 p. 11 figs., 7 tables, 16 refs., 44 eqs. **DWB**—The geometry of zone audibility is set out. In 16 experiments explosions at 7–10 points in England were reco on lattices of microphones. Audibility (up to 387 km) and time of travel are tabulated. experiments gave, with certain assumptions, the vertical distribution of temperature and w 18–50 km. Temperature at 50 km varied from 310°A in July and Aug. to 264°A in Wind at 30–45 km changed from westerly 40–80 m/s in winter to easterly < 20 m/s in sum Radiosonde measurements up to 18 km are given for comparison. *Subject Headings:* **1. Ac tical soundings 2. Upper air temperatures 3. Upper air winds 4. England.**—*C.E.P.B.*

SOIL TEMPERATURE

See: **Mean daily temp. in upper soil layers** (Schmidt), 7.11–107.

WATER TEMPERATURE

See also: **Sea temp. oscillations** (Arthur), 7.11–63; **Sea temp. variations** (Leipper), 7.11–64; **Sea temp.** (Picotti), 7.11–65; **Wind-produced homogeneous layer in oceans** (Lumby), 7.11–66.

7.11–206 551.526.6:551.465(265/6)

Cromwell, Townsend and Reid, Joseph L., Jr. (*Scripps Inst. of Oceanog., Univ. of Calif.*), **study of oceanic fronts.** *Tellus*, Stockholm, 8(1):94–101, Feb. **1956.** 6 figs., 12 refs. **C**—Oceanic fronts and frontal layers are defined. Temperature data obtained at two nts in the equatorial Pacific are presented and a particular circulation, considered basic the existence of a front, is proposed. Vertically isothermal warm water overlies the stable ntal layer. This suggests that vertical mixing in the isothermal water maintains the frontal er in the same way that wind-induced vertical mixing maintains sharp thermoclines. The ta suggest that the depth of vertical mixing is different in the warm and cool water masses jacent to one of the fronts. It is suggested that the change in vertical mixing regimes ntributes to the horizontal gradients of properties across this front. *Subject Headings:* **Oceanic fronts 2. Pacific Ocean.**—*Authors' abstract.*

7.11–207 551.526.6(269) 551.463(269)

Hasle, Grethe Rytter, **Phytoplankton and hydrography of the Pacific part of the Antarctic ean.** *Nature*, London, 177(4509):616–617, March 31, **1956.** fig. **DWB**—Describes the ucture (temperature, salinity and stability) of Antarctic and sub-Antarctic waters to a pth of 150 m, and their effect on the distribution of phytoplankton. *Subject Headings:* **Hydrography 2. Sea temperature 3. Antarctic Seas.**—*C.E.P.B.*

7.11–208 639.223:551.526.6(268.3)

Lee, Arthur, **British fishery research in the Barents Sea.** *Polar Record*, Cambridge, 53):109–117, May **1956.** 3 figs., 9 refs., photo. **DLC**—An account of the researches of the rctic Team of the Fisheries Laboratory, Lowestoft, in the Arctic fishing grounds since 1949. he distribution of cod is studied in relation to environmental factors, the front between cold nd warm water being especially favorable. The recent amelioration of climate has caused a treat of the ice-edge, lengthening the fishing season, and also improved the cod stocks, robably because the stronger southerly West Spitsbergen Current facilitates dispersal. A hoto of the research ship "Ernest Holt" is given. *Subject Headings:* **1. Cod fishing 2. Sea mperature effects 3. Barents Sea.**—*C.E.P.B.*

PRESSURE AND WIND

PRESSURE

See also: **Arctic upper atmos. pressure** (LaGrow, Ainsworth), 7.11–124; **Constant absolute vorticity trajectories** (Maine, Pierrehumbert), 7.11–141; **Atmos. solitary wave** (Abdullah), 7.11–165; **Vertical energy transfer** (Milic), 7.11–169; **Baroclinic structure of atmos.** (Saltzman), 7.11–171; **Secular changes of standing circulation** (Kraus), 7.11–172; **Tornado pressure jump** (Newstein), 7.11–183.

7.11–209 551.541

Kühn, Udo, **Ein Beitrag zur Kenntnis kurzperiodischer Luftdruckschwankungen.** [A ontribution to knowledge of short-period pressure oscillations.] *Zeitschrift für Meteorologie*, Berlin, 10(3):86–93, March **1956.** 6 figs., 33 refs. **DLC**—Observations of microbarometric oscillations (3 to 1/20 Hz) were made at Dresden at 7 and 14 h, Dec. 1953 through Nov. 1954. They averaged about 4×10^{-3} mm Hg, greatest in fall and at 14 h, least in spring and at 7 h. They were greatest in polar and least in tropical air, increased very rapidly with (wind velocity)^2, and were greatest with SE and WNW winds. Only a rough relation was found to urbulence. Periodogram analysis showed regularly recurring frequencies. They may be lue to turbulence elements. *Subject Heading:* **1. Pressure microvariations.**—*C.E.P.B.*

7.11–210 551.543.2:551.5

Matsukura, H. and Kubo, H., **On the annual variation of air pressure over the Far E** *Journal of Meteorological Research*, Tokyo, 7(3):143–147, March **1955.** 8 figs., eq Japanese; English summary p. 143. **DWB**—The annual variation of air pressure ov Far East is examined using harmonic analysis of monthly mean air pressure at each point with 5-degree interval. The displacement of the position with the maximum amp of annual, semi-annual, $\frac{1}{3}$-year, $\frac{1}{4}$-year and $\frac{1}{5}$-year harmonic variation of air pressure level of isobaric height of 500-mb and 700-mb surface and of thickness between 500-m 700-mb surface is shown in Fig. 3. The distribution of the area with the minimum amp of each harmonic variation is shown in Fig. 2. And the distribution of phase angle o harmonics is shown in Figs. 5–9. Then, these results are discussed from synoptical po view. *Subject Headings:* **1. Annual pressure variations 2. Upper air pressure vari 3. Far East.**—*Authors' abstract.*

7.11–211 55

Hutchings, J. W. and Farkas, Edith, **Correlation between the simultaneous interdi heights changes of the 1000 mb and 500 mb pressure surfaces.** *New Zealand. Meteorol Service, Technical Note*, No. 102, Sept. 25, **1953.** 2 p. table, 2 refs. **DWB**—Comput of the coefficient of correlation between simultaneous interdiurnal changes in height 1000 mb and 500 mb surfaces for an oceanic station (Auckland, New Zealand) and a contin station (Kalgoorlie, Western Australia) for one winter and one summer season show a sistently higher correlation for the oceanic station. The results are in agreement with more extensive computations by HOINKES (1950). *Subject Headings:* **1. Interdiurnal pre height changes 2. Correlation coefficients 3. New Zealand.**—*Authors' abstract.*

TURBULENCE

See also: **Turbulence** (Heath-Smith), 7.11–70; **Gustiness** (Bol'shakov), 7.11–102; **Vertical gustiness recorder** (Jones), 7.11–122; **Turbulent gravitational convection** (Morton et al.), 7.11–170; **Deacon wind profile** (Davidson, Barad), 7.11–221; **Dune formation** (Matschinski), 7.11–226.

7.11–212 551

†Agostini, L. and Bass, J., **The theories of turbulence.** *U. S. NACA, Technical Memo dum*, No. 1377, Oct. **1955.** 163 p. 20 figs., 43 refs., eqs. **DWB.** Translation of their " theories de la turbulence." *France. Ministere de l'Air, Pubs. Scientifiques et Techni* No. 237, 1950. (*See* 4A–126, Jan. 1953, *MAB.*) –Covers all aspects of statistical turbule correlations and spectral functions, dynamics of turbulence, theory of local isotropy statistical equilibrium; and decay of turbulence. The appendix gives some empirical or results. *Subject Headings:* **1. Turbulence theory 2. Statistical theory of turbul 3. Translations.**—*M.R.*

7.11–213 551.551:551.557:62

Allan, R. M., **Results of a flight investigation on clear air turbulence at low altitude u a Meteor Mk. 7 aircraft.** *Farnborough, England. Royal Aircraft Establishment, Techn Note*, No. Aero. 2390, Sept. **1955.** 10 p. 6 figs., 2 tables, 5 refs. Mimeo. **GB-MO**—A tinuous accelerometer record was made on 50 flights of 580 naut mi, Laham-Lyme Regis back, in a Meteor aircraft at 400 kt at heights of 50–1000 ft above ground. Distributio minutes per gust of different magnitudes is tabulated; there were 130 of 1 g or over, or 1 7.06 min. The highest was 2.6 g. Positive gusts were considerably more frequent t negative, especially above 1.2 g (ratio 18:1). Effects of wind and sun is shown by data 4 typical flights and pilots' comments. Wind caused more severe turbulence than sun. *ject Headings:* **1. Clear air turbulence 2. Airplane observations.**—*C.E.P.B.*

7.11–214 551.551 532.5

Batchelor, G. K. and Proudman, I., **The large-scale structure of homogeneous turbule** *Royal Society of London, Philosophical Transactions*, Ser. A, 248(949):369–405, Jan. 5, 1

:fs., eqs. **DWB**—This highly mathematical paper re-examines the theoretical basis of ·bulence. Contents: The background to the investigation. The nature of the problem. hypothesis of convergent integral moments at an initial instant. The generation of power- forms of velocity cumulants at large values of the separation. Kinematical structure of large-scale motion. General dynamics of the large-scale motion. The final period of ay. The special case of isotropic turbulence. Appendices: Evaluation of some isotropic face integrals. The form of integral moments of solenoidal tensors. *Subject Heading:* **Turbulence theory.**—*C.E.P.B.*

7.11–215 551.551:533.15

Frenkiel, F. N. and Katz, I., **Studies of small-scale turbulent diffusion in the atmosphere.** *rnal of Meteorology*, 13(4):388–394, Aug. **1956.** 6 figs., 3 tables, 10 refs., 11 eqs. **DWB**—riations in radii of smoke puffs set off from a tethered balloon at Tilghman Island, Md., e measured from 2 cinefilms. Basic equations of dispersion from a point source are set out, l characteristics of small scale turbulence are found to agree with theory when radii are rapolated to −1 sec to obtain straight line increase with time. Some measurements on oke puffs in the stratosphere and on soap bubbles in a wind tunnel are compared. *Subject ading:* **1. Turbulent diffusion.**—*C.E.P.B.*

7.11–216 551.551:551.573:533.607

Hay, J. S., **Evaporation from a saturated rough surface into a turbulent air stream.** *rton, England. Chemical Defence Experimental Establishment, Porton Technical Paper*, . 533, **1956.** 13 p. 5 figs., 4 tables, 14 refs., eqs. Mimeo. **DWB**—Evaporation from gh and smooth saturated plaster surfaces was measured in a wind tunnel, together with rtical distribution of wind speed and vapor content in the lowest few cm. Evaporation creased almost linearly with wind speed 1–9 m/s but over the smooth surface it was only out half that above a rough surface of the same basal area. Results are discussed in terms the analogy between momentum and mass transfer. *Subject Heading:* **1. Evaporation search.**—*C.E.P.B.*

7.11–217 551.551:551.510.53:551.507.321.2

Lettau, H., **Turbulence in the stratosphere.** *American Meteorological Society, Bulletin*, (4):178–179, April **1955. DWB**—In a previous article by A. Arnold (*see* 6.9-203, Sept. 55, *MAB*), the swaying of radiosondes in the stratosphere is attributed to relatively strong rtical gusts at heights between 24 and 32 km. The present author cites evidence for the pothesis that the balloon "may have responded to intrinsic accelerations which can occur an absolutely calm stratosphere" rather than to stratospheric turbulence. *Subject Headings:* **Turbulence in the stratosphere 2. Balloon performance.**—*I.L.D.*

7.11–218 551.551:531.3

Liu, Vi-Cheng, **Turbulent dispersion of dynamic particles.** *Journal of Meteorology*, 3(4):399–405, Aug. **1956.** 17 refs., 50 eqs. **DWB**—Also issued as: Michigan. Univ. ngineering Research Institute, Contract No. AF 19(604)-792, Scientific Report No. 2, Oct. 955. 20 p. 18 refs., 9 eqs.—This article discusses turbulent dispersion of particles whose ze and inertia are such that it cannot be assumed that they will follow exactly the fluctuations f the fluid elements with which they are associated. The turbulent field is assumed to be tationary, homogeneous and isotropic. Stationary, extraneous force fields for the particles ay exist. The method of generalized harmonic analysis (Wiener) is used to determine the tatistical particle-dispersion parameters in terms of the spectrum density of the turbulent eld and the physical characteristics of the particles. The discussion is restricted to one- imensional problems; it includes consideration of the relation between turbulent dispersion nd Brownian motion of the particles due to molecular impacts. An illustrative example of ispersion calculation with a given turbulence spectrum is presented, and aspects of practical pplications are discussed briefly. *Subject Headings:* **1. Turbulent dispersion of particles . Particle dynamics.**—*Author's abstract.*

WIND DISTRIBUTION AND VARIATION

See also: **Determination of wind direction and speed from moving vessel** (Lebedev), 7.11–105; **Gravity waves and sea breeze** (Donn et al.), 7.11–167; **Secular changes of standing circulation** (Kraus), 7.11–172; **Monsoon rainfall** (Rai Sircar), 7.11–255.

7.11–219 551.552:551

*Dirmhirn, Inge, **Vergleichende Betrachtungen über die Windverhältnisse an der H Warte, Wien und im mittleren Marchfeld.** [Comparisons of the wind conditions a Hohe Warte, Vienna, and in the middle of Marchfeld.] *Wetter und Leben*, Vienna, 7(5/6) 114, 1955. 2 figs., 5 tables, 3 refs. **DLC, DWB**—This study of wind conditions was ca out in a flat and treeless cultivated area (Marchfeld) and at the Hohe Warte where shadows are common. Data are given on the mean wind velocity in Obersiebenbrun pressed in per cent of values at Hohe Warte for days on which the prevailing wind dire was the same at both stations, wind velocity according to direction at Obersiebenbru percentage of the values at the Hohe Warte; frequencies of wind direction in 1953/54 for stations and number of hours with wind velocities <6, >36 and >45 km/hour. *Subject Headings:* **1. Wind regime 2. Wind frequency data 3. Marchfeld, Austria 4. Hohe W Vienna, Austria.**—*I.L.D.*

7.11–220 551.553.21

Northeast monsoon of 1954. *Indian Journal of Meteorology and Geophysics*, 6(2):188–189, April 1955. **DWB, DLC**—The northwest monsoon of 1954 slackened in usually the rainiest month, but under the influence of a depression in the Southwest B revived in Dec. The course of the northeast monsoon over South India is described in d *Subject Headings:* **1. Indian northeast monsoon 2. South India.**—*I.L.D.*

7.11–221 551.554:551.551:53

Davidson, Ben and Barad, Morton L., **Some comments on the Deacon wind pr** *American Geophysical Union, Transactions*, 37(2):168–176, April 1956. 4 figs., 6 ta 12 refs., 6 eqs. **DWB, DLC**—Low-level wind profiles measured during Project Great P were used in the determination of z_o, the roughness parameter, and β, the parameter rel to profile curvature in Deacon's formula. Anemometers were geometrically spaced at levels between 40 and 640 cm. The z_o values, one for each observation period, found from four lowest anemometers exceeded the z_o values found from the four highest anemome The β values computed from the highest anemometers departed more from unity than did β values computed from the lowest set. Since the apparent variability of β with height be due entirely to the variability of z_o, another analysis was conducted with the z_o value for all levels and all hours of an observation period. Although the β variation was red by this technique, the departure of β from unity continued to increase with height. Since Calder-Deacon solutions of equations of diffusion from continuous point and infinite sources are functions of β and z_o the effects of the height variation of β and z_o on predict of ground-level concentration were examined. The effects were found to be signific When for each observation period, β was plotted against a modified form of the Richard Number, the fitted curves did not coincide. There are indications that during inver conditions the greatest departures from $\beta = 1$ occurred on nights characterized by the pres of a well-defined low-level wind maximum. *Subject Headings:* **1. Wind profiles 2. Roughn parameters 3. Great Plains Turbulence Project.**—*Authors' abstract.*

SPECIAL WINDS

See also: **Isobaric divergencies in nor'westers** (Bose), 7.11–166; **Blizzards in N. Caucasus** (Ponomarenko), 7.11–261.

7.11–222 551.555:551.5

Edwards, Frank and Corby, G. A., **Winds in the Irish Sea.** *Weather*, 11(8):270, 1956. table. **DWB**—Edwards describes and Corby discusses anomalous E winds in M 1956 at Valley in the lee of Snowdon compared with Ronaldsway, Isle of Man. *Su Headings:* **1. Local winds 2. Topographic effects 3. Irish Sea.**—*C.E.P.B.*

7.11–223 551.555.3:551.515.11(470)

*Kir'ianov, M. G., **Fen na iuge Kryma 30–31 marta 1952 g.** [Föhn in southern Crimea, rch 30–31, 1952.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:34–36, May/June **1955.** gs. **DWB**—The synoptic condition associated with the appearance of the föhn of March 31, 1952, and the variations, temperature, humidity and wind regimes at Alushta and ta are discussed with the aid of a synoptic map and graphs, respectively. The process orographic cyclogenesis in the Crimea and its role in föhn formation are discussed. *Subject adings:* **1. Föhn development 2. Föhn weather cyclogenesis 3. Crimea, U.S.S.R.**—*I.L.D.*

WIND EFFECTS

See also: **Generation of elec. by wind power** (Golding), 7.11–5; **Arctic aeropalynology** (Polunin), 7.11–36; **Wind-produced homogeneous layer in oceans** (Lumby), 7.11–66; **Sea disturbance due to wind** (Walden), 7.11–67; **Elec. energy from wind** (Golding), 7.11–87; special bibliography on **Tropical cyclone theory**, p. 1405.

7.11–224 551.556:551.311.31

King, Cuchlaine A. M., **The coast of south-east Iceland near Ingolfshöfdi.** *Geographical urnal*, London, 122(2):241–246, June **1956.** 4 figs., 7 refs. **DWB**—Discussion of a wind-med and a wave-formed bar on the rocky island, with a consideration of wind action in ming both types of bar. *Subject Headings:* **1. Wind effects 2. Sand bars 3. Iceland.** *C.E.P.B.*

7.11–225 551.556:551.311.31

Landsberg, S. Y., **The orientation of dunes in Britain and Denmark in relation to wind.** *ographical Journal*, London, 122(2):176–189, June **1956.** 11 figs., 3 tables, 12 refs. **DWB**—e formation of U-shaped dunes which develop in masses near the coasts, with orientation sulting from the prevailing wind, is analyzed. The resultant wind vectors are calculated m the English or Danish Beaufort scale equivalents (which differ appreciably) and compared th dune orientation. In most cases good agreement is found, but in some there are con-lerable discrepancies which are explained by local wind deviations due to topography. AGNOLD's method of calculating wind effect gives the best results. A number of maps of nes and wind vectors are given. *Subject Headings:* **1. Wind effects 2. Sand dunes.**—*E.P.B.*

7.11–226 551.556:551.551:551.311.31

Matschinski, Matthias, **La formation des dunes dans les déserts.** [Formation of sand unes in the deserts.] *La Nature*, Paris, No. 3241; 169–175, May **1955.** 17 figs. (incl. notos), 4 refs. **DLC**—A semitechnical article on dunes with many photographs and schematic awings illustrating the dynamics of dune formation and effects of dunes on winds. System-ic turbulence of several types occurs in connection with dunes. Methods of measuring ight, distance between dunes, slope, movement, etc. are discussed. The desert people ink of the dunes as eternal; the people of northern Europe think of them as constantly ifting. Both are correct. In fact, the Arabs have given names to permanent dunes. *Sub-ct Headings:* **1. Turbulence over sand dunes 2. Sand dunes.**—*M.R.*

7.11–227 551.556:631.4

U. S. Soil Conservation Service, **Facts about wind erosion and dust storms on the Great lains.** *U. S. Dept. of Agriculture, Leaflet*, No. 394, June **1955.** 8 p. photos. Price: 10, from U. S. Govt. Print. Off., Wash., D. C. **DWB**—Drought and dust have been a ctor in the Great Plains for ages, though at certain periods (about once each 20 yrs or so) ne situation has become aggravated for one reason or another. Droughts during early ttlement, the long drought from 1931–1938 (Dust Bowl), rainy period from 1940–49 and ne return of drought from 1950–55 are described and illustrated. How wind erosion starts nd spreads, how to check it, changes in land use and management and emergency measures o check blowing dust until a long range program can be effected, are also treated in this ulletin. *Subject Headings:* **1. Wind erosion 2. Drought on Great Plains 3. Dust blowing revention 4. Dust Bowl 5. Great Plains, United States.**—*M.R.*

7.11–228 551.556:551.465:53

Walden, Hans, **Die Höhe der Windsee bei gleichmässig zunehmendem Wind.** [height of the wind sea in a steadily rising wind.] *Deutsche Hydrographische Zeits* 8(6):236–241, **1955.** 6 figs., 7 refs. German, English and French summaries p. 236. **DW** A diagram is computed showing the wave height (0–8 m) raised by a wind of constant dir increasing from calm at uniform rates of 0.5–5 kn/hr for periods up to 90 hr to speeds of kn. This is verified by observations at Atlantic Weather Ships. *Subject Headings:* 1 **disturbance 2. Wind wave formation.**—*C.E.P.B.*

7.11–229 551.556.2:551.

De Veaux, Eugene J. (*U. S. W. B., Charleston, S. C.*), **Meteorological trend and th parent rise in sea level along the South Carolina coast.** *Monthly Weather Review,* W D. C., 83(10):217–224, Oct. **1955.** 13 figs., 9 refs. **DWB**—The author presents evi indicating that a part of the total rise in sea level along the South Carolina coast is the of secular trends in wind, precipitation and atmospheric pressure. The yearly precipit for Charleston and the moving 5-year averages show deficiencies during periods of lo level and excesses during the period of high sea level. A slight trend towards lower atmospheric pressure is indicated at Charleston for the period 1918–1954. The relatio between wind frequency and sea level is examined by analyzing the combined N-NE-E and SW-W-NW winds during the period 1918–54 and their role in raising or lowering sea *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level 3. Cli trends 4. South Carolina Coast.**—*I.L.D.*

UPPER AIR WINDS

See also: **Fluorescent-particle tracer technique** (Leighton), 7.11–21; **700 mb anomaly charts** (U. S. Air Weather Serv.), 7.11–22; **Ionosphere** (Gautier), 7.11–25; **Turbulence** (Heath-Smith), 7.11–70; **Baroclinic structure of atmos.** (Saltzman), 7.11–171; **Jet stream** (Touart), 7.11–174; **Wind and temp. to 50 km** (Murgatroyd), 7.11–205; **Clear air turbulence at low altitude** (Allan), 7.11–213.

7.11–230 551.557:551.510.535:551.5

Rao, B. Ramachandra and Murty, D. Satyanarayana (both, *Andhra Univ., Walt* **A simple method of studying winds in the ionosphere by using continuous-wave radio.** *Na* London, 177(4522):1222–1223, June 30, **1956.** fig., 2 refs. **DWB**—Transmissions Madras on 31 m reflected once from F2 region and received on 3 vertical aerials at Wa were recorded on the same roll of paper. A typical record shows a displacement of 40–90 from 150–230°E of N. *Subject Heading:* **1. Ionospheric wind measurement.**—*C.E.P.B.*

7.11–231 551.5

§*Ohmstede, William D. and Dean, Gordan A., **Examples of the field of motion and wea in the Western Central Pacific.** California. Univ. Institute of Geophysics. Oahu Rese Center, Contract AF 19(604)-546, Scientific Report, No. 13, V. 1–5, Oct. **1955.** Conte Vol. 1, Wind tabulation sheets. unpaged. entirely tables. Vol. 2, Kinematic analyse 1,500 feet. unpaged. entirely folded charts. Vol. 3, Kinematic analyses at 10,000 f unpaged. entirely folded charts. Vol. 4, Kinematic analyses at 20,000 feet. unpa entirely folded charts. Vol. 5, Kinematic analyses at 30,000 feet, 40,000 feet, 50,000 feet 60,000 feet. unpaged. entirely charts. Vols. 6 and 7, completing No. 13, will be issued la **DWB**—Exceedingly detailed analysis of daily winds aloft and other synoptic conditions in troposphere over the Marshall Islands from Oct. 10–31, 1952, a period when a dense netw of observations was available consisting mainly of graphs and charts. *Subject Headi* **1. Winds aloft analysis 2. Streamline analysis 3. Marshall Islands 4. Central Pac** —*M.R.*

7.11–232 551.557.3:53

Buell, C. E. and Hutchings, J. W., **Some aspects of large-scale turbulence phenomen the atmosphere.** *Journal of Meteorology,* 13(4):413–414, Aug. **1956.** fig., 6 refs. **DW** Referring to J. W. Hutchings: **Turbulence theory applied to large-scale atmospheric p**

ena (*J. of Met.*, 12:263–271, 1955; *see* 6.9–225, Sept. 1955, *MAB*), BUELL points out many ures in which large scale motion is not isotropic. The dynamical consequences are set especially in correlations of pressure between different levels. HUTCHINGS agrees that in e scale motions isotropic conditions should be replaced by a more accurate theory. *Subject dings:* **1. Turbulence theory 2. Upper air wind variations.**—*C.E.P.B.*

7.11–233 551.557.35:551.509.317:519.2

Scott, J. R. (*Malaya Met. Service*), **A regression method for estimating time changes lliptically distributed winds.** *Royal Meteorological Society, Quarterly Journal*, 82(353):337–, July **1956.** 2 tables, 4 refs., 4 eqs. Also his: **The zonal wind in the upper troposphere weather at Singapore.** *Ibid.*, p. 340–341. table, ref. **DWB**—The first paper describes nethod of calculating vector correlation and regression. This is applied to sequences of d observations at 50,000 and 15,000 ft over Singapore, and its use in forecasting is suggested. e second paper relates the persistence of above-average zonal (N and W) winds at 50,000 o the damping out of afternoon convection, and suggests that wind persistence may be of ue in short range forecasting. *Subject Headings:* **1. Vector correlation 2. Upper air wind sistence 3. Short range forecasting 4. Singapore.**—*C.E.P.B.*

VERTICAL MOTION

See also: **Large-scale vertical motion in atmos.** (Ballenzweig), 7.11–101; **Vertical gustiness recorder** (Jones), 7.11–122; **Turbulent gravitational convection** (Morton et al), 7.11–170; **Contrails** (Howland, Wallington), 7.11–247; **Wave clouds** (Larsson), 7.11–248; **Snow generating cells** (Douglas), 7.11–258.

7.11–234 551.558.21:532.59:551.43

Corby, G. A. and Wallington, C. E., **Airflow over mountains: the lee-wave amplitude.** *yal Meteorological Society, Quarterly Journal*, 82(353):266–274, July **1956.** 5 figs., 4 refs., eqs. Also issued as: *Great Britain. Meteorological Research Committee, M.R.P.*, No. , Sept. 19, **1955.** 7 p. *See item* 7.5–178, May 1956, *MAB.* **DWB**—The effect of mountain e and shape on lee-wave amplitude is discussed; it is greatest when mountain width has a tical relation to the natural wave-length of the airstream. The effect of the wind profile is ne into fully. In the British Isles lee waves are theoretically possible on many occasions, ecially in winter, but are only large when several parameters fall within a narrow range, thin which very large changes of amplitude may result from very small changes of airstream aracteristics. Large-amplitude waves are more likely in airstreams containing a shallow er of great stability than in a deep layer of slight stability. The scale of the mountain is o important. *Subject Heading:* **1. Air flow over mountains.**—*C.E.P.B.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

See: **Atmos. ice, frost, rime, . . .** (Zamorskiĭ), 7.11–12; **Far East Hydromet. Serv.** (Ogir'), 7.11–48.

HUMIDITY AND EVAPORATION

See also: **Evaporation from natural surfaces** (Felméry), 7.11–104; **Hourly dry- and wet-bulb temp.** (Shellard), 7.11–116; **Natural and artificial rain** (Sutcliffe), 7.11–147; **Infrared determination of precipitable water vapor** (Gates), 7.11–189; **Evaporation from saturated rough surface** (Hay), 7.11–216; **Temp. and humidity over plants** (Berger-Landefeld et al.), 7.11–281.

7.11–235 551.571:581.11

Huber, Bruno, **Tages- und Jahresrhythmen im pflanzlichen Stoffwechsel—ein lehrreiches ispiel aus der Botanik.** [Day and year rhythms in plant food exchange: an instructive ample from botany.] *Umschau*, 56(10):302–304, May 15, **1956.** 4 figs., 5 refs. **DLC**—ant transpiration reaches a maximum in the morning, which is earlier the drier the habitat.

At medium humidity there is a secondary peak in the afternoon. Assimilation inc earlier in the morning than transpiration and has a secondary minimum at midday. annual variation of plant activity has a double maximum with a secondary minimum a summer. *Subject Headings:* **1. Plant rhythms 2. Transpiration.**—*C.E.P.B.*

7.11–236 551.571.3

Ashmore, S. E., **Abnormally dry air.** *Weather*, 11(8):270, Aug. **1956. DWB**—C observations at Wrexham of relative humidity 40% on Nov. 29, 1953 and 31% on Ja 1956, the latter in Arctic air. *Subject Headings:* **1. Humidity extremes 2. Wrexham, W** —*C.E.P.B.*

7.11–237 551.573:55

Csehidi, Géza, **A párolgás megoszlása Szlovákiában.** [Distribution of evaporati Slovakia.] *Hidrológiai Közlöny*, Budapest, 35(5/6):213–214, May/June **1955.** 2 figs., 1 **DWB**—Two maps of Slovakia are presented, showing 1) isolines of annual mean evapor (according to O. Dub) and 2) evaporation during the growing season expressed in perce values of the annual evaporation (according to S. Fekete). Annual evaporation was c mined from precipitation and runoff charts (1931–1940) as the difference between precipit and runoff. Monthly evaporation values were derived from the annual evaporation an monthly saturation deficit (1901–1940). It appears that evaporation exceeds precipit values near the Danube and Tisza rivers in summer. In other regions precipitation ex evaporation throughout the year. *Subject Headings:* **1. Evaporation data 2. Precipita evaporation ratio 3. Slovakia.**—*G.T.*

7.11–238 551.573:581.11

Green, F. H. W., **Observations of potential evapotranspiration.** *Nature*, Lon 178(4524):104, July 14, **1956.** ref. **DWB**—Evapotranspiration in the Cairngorms (Scotl in 1955 (a dry year) reached 6.8″ in July and 7.1″ in Aug., much higher than figures give formulas. The year ended with a considerable water deficit, confirmed by stream and levels, wilting of plants, etc. *Subject Headings:* **1. Evapotranspiration 2. Cairngo Scotland.**—*C.E.P.B.*

7.11–239 55

Watanabe, M., **On the evaporation from a rather large pan.** *Journal of Meteorolo Research*, Tokyo, 7(9):560-564, Oct. **1955.** 5 figs., 6 refs., 15 eqs. In Japanese; En summary p. 560. **DWB, DLC.** Also issued as: *Sendai, Japan. Central Meteorolo Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 9(1):3 Nov. **1955.** In Japanese; English summary p. 38.—The author made comparative observa of evaporation by installing two sizes of evaporimeters, diameters of which are 100 cm 20 cm, respectively. From these observations, the following relations were obtained. (1 exponential relation exists between the evaporation from a large pan (E_1) and from a s pan (E_0). (2) The ratio of evaporation (E_0/E_1) decreases exponentially with wind-velo increase. (3) The ratio of the evaporation E_{cal}) from a lake to the evaporation from the l pan, $E_{cal}/E_1=\varphi(E_1)$, is a function of E_1. Approximately, $\varphi(E_1)$ may be expressed as a Gaus error function. *Subject Heading:* **1. Evaporation from pans.**—*Author's abstract.*

CONDENSATION

See also: **Physics of clouds and precip.** (Fournier d'Albe), 7.11–43; **Normal and artificial rain** (Sutcliffe), 7.11–147; **Droplet size distribution in fog** (Wootten), 7.11–155.

7.11–240 551.5

Hentschel, G., **Das Typische im Jahresgang der Kernzahl am NE-Rand von Berlin.** [typical annual variation of nuclei count on the N.E. edge of Berlin.] *Zeitschrift für teorologie*, 10(5):142–147, May **1956.** 6 figs., 9 refs. **DLC**—Measurements of nuclei by bo and aspiration methods in Berlin-Buch are plotted for each year 1951–1955; 3 years in 5 s a peak in April. Number is much higher than in winter and peak cannot be explained

eased fuel consumption or decreased convection. The April peak appears only at 12 h 8 h. It is largest with S, SW and NE winds and is shown best by the aspiration data. ılyzing results in connection with distribution in Berlin leads to the conclusion that the ng maximum is not anthropogenous. It is probably connected with the rapid heating he ground in spring and the resulting gas emission from reduction of albumen. *Subject dings:* **1. Nuclei count variations 2. Berlin, Germany.**—*C.E.P.B.*

7.11–241 551.574.1:551.575

Kuroiwa, Daisuke, **The composition of sea-fog nuclei as identified by electron microscope.** *rnal of Meteorology*, 13(4):408–410, Aug. **1956.** 3 figs., 2 refs. **DWB**—By condensation s, electron-microdiffraction and nitric acid treatment, 225 sea-fog nuclei are divided into salt (40%), combustion products (50%) and soil materials (10%). The procedure is cribed and examples shown after nitric acid treatment. Histograms show 80% larger than diameter, ranging up to 9μ. *Subject Headings:* **1. Nuclei origin 2. Sea fog nuclei.**—*C.P.B.*

7.11–242 551.574.1

McWilliams, S. (*Valentia Obs., Cahirciveen, Ireland*) and Morgan, W. A. (*Met. Service, blin*), **The relation between the concentration of atmospheric condensation nuclei and er meteorological elements at Valentia Observatory.** *Geofisica Pura e Applicata*, Milan, 129–146, May/Aug. **1955.** 16 figs., 3 tables, 8 refs. German summary p. 129. **DWB, C**—Measurements of the concentration of condensation nuclei made twice daily (0 h 1 12 h G.m.t.) with a *Nolan-Pollak* photo-electric counter at Valentia Observatory, in the reme Southwest of Ireland, over the 4 years 1951–1954, are analyzed to show relation with ıer meteorological elements. It is found that concentration at 12 h is generally higher than 0 h and that precipitation at the time of observation or in the preceding hour reduces con- ıtration by between 40% and 50%. From measurements made when there was no precipita- n at the time or in the previous hour it is found that concentration decreases with increasing ıd speed but does not vary appreciably with wind direction apart from a sector from which llution could be expected. High concentrations are found with visibility below 7 mi, with ersion of temperature, and, at 12 h, with low cloud amount. The annual variation of ıcentration of nuclei, when free from the effects of pollution, follows fairly closely that of ration of bright sunshine. *Subject Headings:* **1. Condensation nuclei 2. Nuclei and rain Nuclei eliminating agents 4. Valentia Observatory, Ireland.**—*Authors' abstract.*

7.11–243 551.574.2:551.509.62:541.14

Birstein, S. J., **The role of adsorption in heterogeneous nucleation, Pt. 2, The adsorption water vapor on photolyzed silver iodide.** *Journal of Meteorology*, 13(4):395–398, Aug. **56.** 6 figs., 12 refs. **DWB**—The effectiveness of AgI as a nucleating agent depends on its ility to adsorb and orient water molecules, and is destroyed by photolyzation by UV or nlight. Adsorption by photolyzed and unphotolyzed AgI and lead iodide was studied at 20 and −20°C. As the AgI surface is reduced, adsorption increases but the orientation the water molecules changes in such a way as to inhibit adsorption of ice-oriented layers, that at −20°C the photolyzed material does not form an ice crystal. (**Pt. 1,** *Ibid.*, 12(4): 4–331, Aug. **1955;** *see item* 6I–131, Sept. 1955, *M.A.B.*) *Subject Headings:* **1. Silver iodide operties 2. Photolytic inactivity.**—*C.E.P.B.*

7.11–244 551.574.41:551.508.74(437)

*Krhounek, Slavomír, **Význam rosy a její měření.** [Importance of dew and its measure- ent.] *Meteorologické Zprávy*, Prague, 9(2):56–61, **1956.** 6 tables, 7 refs. Russian and ench summaries p. 56. **DWB**—The optical dew measurement technique developed by UVDEVANI is described in detail. Data on monthly (May–Sept.) amounts of rainfall and w measured at 8 stations in Bohemia and Moravia are presented for each year of the period 50–1954, and for 15 stations for 1955. Values obtained at 6 a.m. are also compared with a.m. values. *Subject Headings:* **1. Dew measurement technique 2. Dew data 3. Czecho- ovakia.**—*G.T.*

FOG

See: **Photochemical processes in urban air** (Leighton, Perkins), 7.11–15; **Ventilation of Oxford Circus** (Whiten), 7.11–154; **Droplet size distribution in fog** (Wootten), 7.11–155; **Sea-fog nuclei composition** (Kuroiwa), 7.11–241.

CLOUDS

See also: **Clouds, wind and weather** (Hader), 7.11–7; **Height *vs.* time presentation of radar echoes** (Miles), 7.11–109.

7.11–245 551.576.1 :551.

Alberti, Christian, **Eine interressante Gewitterwolke.** [An interesting thunders cloud.] *Zeitschrift für Meteorologie*, 10(2):64, Feb. **1956.** fig. **DLC**—July 15, 1955, Le in a local evening heat thunderstorm, sudden fountain-like uprushes of false Ci were obse above a CuNb incus. This occurred several times in several places, followed by gentle sidence. *Subject Heading:* **1. Thunderclouds.**—*C.E.P.B.*

7.11–246 551.576.1 :551.

Hoddinott, M. H. O., **Shower cloud over the Mersey.** *Weather*, 11(8):260–261, **1956.** fig., 4 photos. **DWB**—There is a tendency for CuNb to develop over the widest of the Mersey estuary and on either side (photos) in polar air coming from the Irish This is brought out by a map of isohyets, a local excess being due to the warmth of Live and Birkenhead. *Subject Headings:* **1. Shower clouds 2. Liverpool, Eng.**—*C.E.P.B.*

7.11–247 551.576.1 :629.135.2 :551.5

Howland, B. G. and Wallington, C. E., **Intermittent contrails.** *Weather*, 11(8) Aug. **1956.** fig. **DWB**—Howland describes a contrail forming a series of dashes and gests it was formed in a series of waves. Wallington agrees that it could have been du waves set up by the Cotswolds in a 3-layer troposphere. *Subject Heading:* **1. Condensa trails.**—*C.E.P.B.*

7.11–248 551.576.1 :551.5

Larsson, L., **Wave clouds in Sweden.** *Weather*, 11(8):261, Aug. **1956.** fig., 2 ph **DWB**—Two photos of wave clouds at Ostersund on June 5, 1955, are given, with a grap upper air conditions. *Subject Headings:* **1. Wave clouds 2. Sweden.**—*C.E.P.B.*

7.11–249 551.576.4 :551.509

de Bary, E. and Möller, F., **Über die Höhenverteilung der Wolken bei verschiede Wetterlagen.** [On the height distribution of clouds in different weather situations.] *teorologische Rundschau*, 9 (7/8):130 -134, July/Aug. **1956.** 10 figs., 2 tables, 4 refs. **DW** Observations of cloud height on weather flights in 1936, 1938 and 1939 in Germany are analy for 10 weather types. Complicated diagrams show the frequencies of upper and lower cl limits on winter and summer mornings, by km steps, 0 -10 km. The text explains that results, while not very definite, are readily explicable synoptically, and will be still n intelligible when the cloud types are considered. *Subject Headings:* **1. Cloud heig 2. Weather types 3. Germany.**—*C.E.P.B.*

7.11–250 551.5

Krebs, H.-D. and Doege, W., **Ein Beitrag zum Problem der Cirrusbewölkung.** contribution to the problem of cirrus cloud.] *Meteorologische Rundschau*, 9(7/8):135– July/Aug. **1956.** 7 tables, 11 refs. **DWB**—The height of cirrus is generally underestima from the ground. A method of estimating the height of the lower and upper limits f marked changes of temperature in radiosonde ascents compares well with Chambers' airpl measurements. It is considered that the occurrence of moist-labile gradients coinciding v increased gradients (generally above 0.65°C/100 m) shows that the cause of pure cirru generally ascent of air due to convergence or divergence. Slow upglide along a bound between air masses causes cirrostratus. *Subject Headings:* **1. Cloud height measurem 2. Cirrus clouds.**—*C.E.P.B.*

PRECIPITATION

See also: **British rainfall 1954**, 7.11-13; **Statistical study of intense rains** (Bultot), 7.11-14; **Physics of clouds and precip.** (Fournier d'Albe), 7.11-43; **Forest conditions, Peloponnesus** (Beuermann), 7.11-82; **Heavy rainfall** (Wolf), 7.11-88; **Height vs. time presentation of radar echoes** (Miles), 7.11-109; **Ceylon** (Jackson), 7.11-184; **Evaporation, Slovakia** (Csehidi), 7.11-237; **Shower cloud** (Hoddinott), 7.11-246.

7.11-251 551.577.21(624)

*Sudan. Meteorological Service, **Average rainfall maps, 1921-1950 (MM).** Khartoum, v. 4, 1954. Presentation signed A. W. Ireland, Govt. Meteorologist. 15 Maps (fold.) Average Monthly Rainfall Maps. One Average Annual Rainfall Map. One Probable or of Average Annual Rainfall Map. All to the scale 1:8 million. **DWB**—Last chart es probable error of average annual rainfall, varying from 20 to 160 mm from N. to S. cellent monthly rainfall charts of Anglo-Egyptian Sudan with isohyets carefully drawn in ink for 2.5, 5, 10, 25, 50, 75, 100, 150, 200, 250, 300, and 350 mm. Over half of the territory s no rainfall from mid-Oct. through March, rain occurring only in the extreme south and ng the E. coast (Red Sea). Annual mean chart shows variation from 25 mm in N. to 000 mm. in extreme S. and S.E. *Subject Headings:* **1. Isohyetal charts 2. Precipitation mals 3. Sudan.**—*M.R.*

7.11-252 551.577.34(410)

Glasspoole, John, **Rainfall averages.** *Weather*, 11(8):254-256, Aug. **1956.** 6 refs. **DWB** Referring to W. N. McClean (*Weather*, 11(1):17, Jan. 1956; *see item* 7.8-203, Aug. 1956, 4*B*) Glasspoole refutes the contention that 1881-1915 is not a suitable period for standard mals for Britain. It is reasonably representative, and is convenient. *Subject Headings:* **Rainfall trends 2. British Isles.**—*C.E.P.B.*

7.11-253 551.577.34(427)

Reynolds, G., **Abrupt changes in rainfall regimes.** *Weather*, 11(8):249-254, Aug. **1956.** igs., 2 tables, 3 refs. **DWB** -Cumulative residuals of annual rainfall at Bidston, Liverpool, 57-1955, show 4 or 5 distinct regimes, the differences being statistically significant. The ubination of normal frequency curves with different means results in the skew distribution the annual rainfall. Seasonal trends for autumn and winter also show dry and wet periods years. *Subject Headings:* **1. Rainfall trends 2. Bidston, Liverpool, Eng.**—*C.E.P.B.*

7.11-254 551.577.36:519.241.8(944)

Das, S. C. (*Australian Nat. Univ., Canberra, A.C.T.*), **The fitting of truncated type III rves to daily rainfall data.** *Australian Journal of Physics*, Melbourne, 8(2):298-304, ne **1955.** table, 5 refs., 15 eqs. **DWB, DLC**—The method of maximum likelihood has en used to fit a truncated type III (Gamma) distribution to daily rainfall data for Sydney er the period 1859-1952. An approximate test of the hypothesis that there is a singularity the origin is suggested. This test is based on a comparison of the expected frequency in the ncated part, when the observed frequency in this part is taken into account in the fit, th the expected frequency when these observations are neglected. For Sydney the test ows that there is no evidence in the rainfall data for a singularity at the origin. *Subject eadings:* **1. Rainfall frequencies 2. Frequency distributions 3. Sydney, Australia.** - *uthor's abstract.*

7.11-255 551.553.21(54):551.577.36

*Rai Sircar, N. C. (*Met. Office, Poona*), **Some aspects of monsoon rainfall in India.** *Indian urnal of Meteorology and Geophysics*, New Delhi, 6(3):217-224, July **1955.** 6 figs., 7 tables, refs. **DLC**—In this note, the day-to-day rainfall during the monsoon season in four small eas of 50 miles radius round about Calcutta, Delhi, Tiruchirapalli and Bangalore has been udied with a view to finding out what percentage of the monsoon rainfall occurs on what rcentage of the days with precipitation in each of these areas. It is observed that although ese areas fall within different rainfall regimes, the percentages of days with rain that account r a particular fraction of the total rainfall in these areas are nearly equal. A study has also en made of the rainfall over these areas during the monsoon season, associated with synoptic

disturbances. It is found that the percentages of the disturbances which cause the ... fraction of the total rainfall derived from such disturbances do not also differ appreciably ... one area to another. *Subject Headings:* **1. Monsoon rainfall frequencies 2. India.** *—Au... abstract.*

7.11–256 551.577.36:551.5...

Swayne, W. W. (*Hydromet. Sec., U. S. W. B., Wash., D. C.*), **Quantitative analysis ... forecasting of winter rainfall patterns.** *Monthly Weather Review*, Wash., D. C., 84(2):5... Feb. **1956.** 6+figs., 3 tables, 24 refs., 9 eqs. **DWB, DLC**—A method is given for an... of current rainfall intensity distribution and for preparation of short-period quantit... rainfall distribution forecasts using practical synoptic techniques. The analysis proce... is justified by a formulation which gives the condensation rate associated with the horiz... transport of saturated air through a stationary temperature field. The forecast proce... in addition utilizes (1) short-period extrapolations of the fields of moisture, motion, and ... perature, (2) volumetric inflow of moisture in depth northward across a fixed boundary ... the Gulf Coast as an approximation of the total rainfall during the forecast period, or ... this is not applicable, the volume indicated by the moisture-depletion formulation, (3) ... velopment of the initial and terminal period boundaries of moisture depletion to defin... boundaries of the forecast pattern, (4) position of the maximum moisture advection to fo... the rainfall center, and (5) isohyetal analogues to fill in details of the pattern, particularl... orographic details which have not been treated otherwise in the present application. ... results of a systematic test of forecasts using these ideas are also presented. *Subject Head...* **1. Quantitative rainfall forecasting 2. Rainfall intensity distribution patterns 3. So... eastern United States.**—*Author's abstract.*

RAIN AND SNOW

See also: **Radar-echo intensities in melting layer** (Wexler et al.), 7.11 110; **Natural and artificial rain** (Sutcliffe), 7.11–147.

7.11–257 551.578.41 536.421:546...

Bass, R. and Magun, S., **Eiskrystalle.** [Ice crystals.] *Naturwissenschaften*, Be... 43(10):213–217, May 15, **1956.** fig., 23 refs. **DWB**—Only the hexagonal forms of ice cry... are considered. A variable molecular structure is postulated to explain the variable cr... form. Needles and dendrites result from heat liberated by alternate supercooling or su... saturation and transport in the medium. Plates form in slow uniform cooling of large c... water surfaces by radiation to space, causing a flow of heat in one direction only. They ... together as large composite crystals, as can be seen by the "negative crystals" forme... melting by radiant heat (Tyndall figures). The formation of snowflakes from the vapor p... follows the same laws. There are nuclei of melting as well as of freezing. *Subject Head...* **1. Freezing of water 2. Snow crystal growth.**—*C.E.P.B.*

7.11–258 551.578.41:551.558.1:551.50...

Douglas, R. H. (*Met. Service of Canada*), **Snow generating cells.** *Royal Meteorolog... Society, Canadian Branch, [Publications]*, 6(2), March 31, **1955.** 15 p. 8 figs. (incl. phot... table, 14 refs. **DWB**—A review of recent discoveries regarding the mechanism of s... formation in supercooled supersaturated (with respect to ice) clouds, and the snow genera... cells discovered in 1951–2 by the Stormy Weather Research Group at McGill Univ. under... direction of J. Stewart Marshall. Snow trails from these cells often reach the gro... The question as to whether or not they align themselves in rows like billow clouds rem... to be solved. Nomograms are included for thermodynamic, moisture and vertical mo... calculations related to snow generation in clouds. *Subject Headings:* **1. Snow generating c... 2. Radar snow observation. I. Marshall, J. S.**—*M.R.*

7.11–259 551.578.45(5...

Bhan, Som Nath (*Met. Obs., Srinagar*), **Unusual snowfall at Srinagar on April 12-... 1955.** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(4):366–367, Oct. 19... **DWB, DLC**—The weather preceding and during the snowfall is described. The snow...

preceded by drizzle and rainfall which turned into heavy, abnormally large snowflakes a drop in temperature. The snow accumulation amounted to about 2 in. *Subject ings:* **1. Snowstorms in spring 2. Srinagar, India.**—*I.L.D.*

.11–260 551.578.45(439.1) 551.578.46(439.1)
Kéri, Menyhért, **Rekord hóvastagság a Dunántúlon 1955 márciusában.** [Record snow in western Hungary in March 1955.] *Idojárás*, Budapest, 59(3):189–190, May/June fig. **DWB, DLC**—Two successive heavy snowstorms (a rare event in March) created ne snow conditions in western Hungary in March 1955. Snow depths up to 90 cm were ured and the number of days with snow cover was 15–20 for the month. These figures igher than the average values for Feb. In some regions the snow cover lasted as late as th 23. A chart showing distribution of maximum snow cover in March 1955 in western gary is presented. *Subject Headings:* **1. Snowstorms in spring 2. Snow cover 3. Hun-**—*G.T.*

7.11–261 551.578.45:551.555.6(234.8)
Ponomarenko, I. N., **Neobychnye meteli v vostochnykh raïonakh Severnogo Kavkaza.** usual blizzards in the eastern regions of northern Caucasus.] *Meteorologiia i Gidrologiia*, 1:30–31, Jan./Feb. **1955. DWB**—A description of severe snow storms that occurred in eastern parts of northern Caucasus between Jan. 6 and 12, 1950. Wind velocities of 2 m/sec and even of 35–40 m/sec were recorded. Northwesterly and westerly winds ailed. The snow storms were not associated with the incursion of a northward cyclone an accompanying front but with the appearance and development of a special low. The irculation associated with snow storms in the Caucasus during the period 1948–1951 is ssed. *Subject Headings:* **1. Blizzards 2. Snowstorms 3. Caucasus.**—*I.L.D.*

HYDROMETEOROLOGY

See also: **Soil humidity** (Uhlig), **7.11–79**; **Nature of Brazil** (Sioli), **7.11–268**; special bibliography on **Tropical cyclone theory,** p. **1405.**

7.11–262 551.579:519.241.8
Chow, Ven Te (*Illinois Univ.*), **On the determination of frequency factor in log-probty plotting.** *American Geophysical Union, Transactions*, 36(3):481–486, June **1955.** s., table, 5 refs., 31 eqs. Also: Oliveira, J. Tiago de (*Univ. of Lisbon, Portugal*), **Corrections solution concerning hydrologic frequency analysis.** *Ibid.*, p. 489–490. eqs. **DWB**—vised procedure is presented for transforming the variate in the log probability (Chow, ., 32(2):231–237, April **1951** and *Ibid.*, 33(2):277–282, April **1952**; *see item* 4.2–216, Feb. , *MAB*). A table is given for computing K-values for log-probability plotting when 1. Oliveira's article corrects some errors of Chow in his solution of the formula for rologic frequency analysis (AGU, Trans., 1952). Chow has revised his own procedure in present article. *Subject Headings:* **1. Hydrologic frequency analysis 2. Log-probability ing. I. Oliveira, J. Tiago de.**—*M.R.*

7.11–263 551.579.4(44)
Babinet, H., **La crue de la Seine de janvier 1955.** [Seine flood in Jan. 1955.] *Société rotechnique de France, Paris, Mémoires et Travaux*, No. 1:43–50, **1955.** 4 figs., tables. : Obolensky, S., **Jaugeages de la Seine à Paris pendant la crue de janvier 1955.** [Gauging ne Seine at Paris during the flood of Jan. 1955.] *Ibid.*, p. 51–56. 2 figs., 4 tables. Also: al, D., **Mesures de débit faites en Seine-Maritime au cours de la crue de janvier 1955: bination de la crue et de la marée.** [Flow measurements in the tidewaters of the Seine ng the flood of Jan. 1955: combination of the flood and the tide.] *Ibid.*, p. 57–63. 6 figs., bles. English summaries at head of each article. Discussion of three articles, p. 67–79. B—The Jan. 1955 flood of the Seine is third in importance of all floods of the past 3 cenes; being surpassed only by those of 1910 and 1658. The present flood was worse than flood in slow moving upper reaches (upper Seine and Marne) but not as bad in swifter ors (Yonne and Loing). A thorough analysis of rainfall, runoff, hydrographs, etc. is n in the 3 articles listed above. In the article by Laval the effect of river flood and tidal

phenomena at the mouth of the Seine is studied in detail. It is shown that at the mouth ... Seine the effects of the flood were felt longer than upstream (e.g., at Rouen). The 1955 ... is compared with several other floods of historic importance at several important p... *Subject Headings:* **1. Floods, Seine (Jan. 1955) 2. Historic floods 3. Tidal effects in ... 4. Seine Basin, France.**—*M.R.*

7.11–264 551.579.4(...

Barney, Keith R., **The 1951 Kansas City Flood.** *American Society of Civil Eng... Proceedings*, Vol. 81, Paper No. 839, Nov. **1955.** 9 p. **DWB, DLC**—This review of the ... flood in the Kansas River Basin emphasizes the effect on industry in the flood plains. ... record-breaking flood caused nearly 500 million dollars' damage in Kansas City, but l... life was small. Industrial buildings suffered in varying degrees, with deposition of silt a ... factor affecting final "cleanup." Industry is rebuilding on old locations as the res... program, started prior to the flood, is speeded up to supplement local levee systems. S... *Headings:* **1. Floods, Kansas City (1951) 2. Kansas City, Kans.**—*Author's abstract.*

7.11–265 551.579.4...

*Mitchell, William D. (*U. S. Geological Survey*), **Floods in Illinois: magnitude and ... quency.** Prepared in cooperation with the U. S. Dept. of the Interior, Geological Su... Issued by Illinois Dept. of Public Works and Building, Division of Waterways, **1954.** ... 28 figs., 8 tables, 27 refs., 8 eqs. in text, plus numerous other tables and figs. **DWB**—... elaborate and voluminous compilation of all flood records available for 108 gaging statio... 13 basins of Illinois. Methods of compilation and adjustment are set forth. Regiona... interregional variations, estimates for ungaged areas, magnitude frequency relation fo... casional floods, role of theory of largest values, glossary of technical terms and a sel... bibliography are included. Many charts, graphs and scatter diagrams are included as ... as the raw tabular material and computed recurrence intervals for each station. Loca... drainage area and records available for each station are noted and the comparative leng... records for every station shown on charts. Composite frequency curves are presente... north, central and south Illinois, for the 1–50 year flood. *Subject Headings:* **1. Flood... quencies 2. Illinois.**—*M.R.*

7.11–266 551.579.5(4...

Borchert, Günter, **Eine Untersuchung über die Wasserführung des Bodens in... hängigkeit vom Witterungsablauf und von der Vegetationsbedeckung.** [Investigatio... water conduction of the soil as a function of weather sequence and vegetal cover.] *Erdk...* Bonn, 10(1):76–81, Jan. **1956.** fig., 26 refs. English summary p. 76. **DWB**—Soil moi... observations to a depth of 1 m at Elbmarsch near Uetersen (Holstein) in 1951–52 in an orc... and bare soil are shown by isopleths. The bare soil was moister but less variable than ... orchard. In winter stored water reaches to within 40–25 cm of the surface, but by summe... level has descended to 80 cm. By loosening and mulching, the surface layer can absorb ... store water. *Subject Headings:* **1. Soil moisture variations 2. Holstein, Germany.**—*C.E.*...

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See: **Aeroclimatic conditions** (Guss, Regula), 7.11–71; **Agromet. research, Hungary** (Kulin), **7.11–77**; **Climate for coffee culture** (Schröder), 7.11–80.

CLIMATE OF PARTICULAR PLACES

See also: **Collected scientific papers** (Academia Sinica), **7.11–1.**

7.11–267 551.582:551.585.7...

Lange, Gottfried, **Zum Klima Hochspaniens.** [Climate of the Central Plateau of Spa... *Meteorologische Rundschau*, 9(7/8):141–142, July/Aug. **1956.** table, 7 refs. **DWB**—A clim...

nary by months is given for Campo San Andres, 40°31'N, 6°11'W, 1723 m, 1924–1927, nly station in Spain representing the northern subcontinental mountain region. Notes ne prevailing circulation and air masses are added. *Subject Headings:* **1. Mountain cli- s 2. Spain.**—*C.E.P.B.*

7.11–268 551.582:551.579(81)

Sioli, Harald, **Über Natur und Mensch im brasilianischen Amazonasgebiet.** [Nature man in the Brazilian Amazon region.] *Erdkunde*, Bonn, 10(2):89–109, April **1956.** s., 10 photos, 38 refs. English summary p. 89. **DWB**—The geological structure is ibed with map and sections. The climatic regions are taken up, with map of KÖPPEN's s (Afi, Ami, Awi) and data of rainfall, raindays and relative humidity for 6 stations. The atology, hydrology and river fluctuations, and the zones of whitewater, clearwater and ckwater, are described. The large estuaries and riverine lakes are attributed to the post- al rise of sea level as well as land subsidence. *Subject Headings:* **1. Climate of Brazil ydrology of Amazon 3. Amazon Basin, Brazil.**—*C.E.P.B.*

7.11–269 551.582.2(773)

Illinois. State Water Survey Div., **Local climatological data, Mt. Vernon, 1901–1954.** a compiled from official U. S. Weather Bureau records. pub. **1955.** [4 p.] almost en- y tables. **DWB**—Tables give means and extremes of usual climatic elements (1901–53), thly and seasonal degree days for each year 1900–1954, average temperature, total precip- on and snowfall for each month 1901–54, and station history and names of observers 1895 to 1955. A brief verbal summary of conditions is included. *Subject Headings:* **ocal climatic data summaries 2. Mount Vernon, Ill.**—*M.R.*

7.11–270 551.582.2(469)

Pereira, Alberto Barata, **Clima de Coimbra: normais e valores dos elementos principais tinuacão do volume publicado em 1942).** [Climate of Coimbra: norms and values of the cipal elements; a continuation of the volume published in 1942.] Coimbra, Tipografia da ntida, **1955.** 36 p. almost entirely tables. At head of cover-title: Instituto Geofisico Coimbra. **DWB**—Rainfall, temperature, pressure, wind, cloud and sunshine data for nbra Observatory for 1941 through 1953 (13 years) are given for the year and for each th of each year. Yearly values of these elements and relative humidity, evaporation, s with various amounts of rain, snow, thunderstorms, frost, etc. for 1866–1953, as well as age values for the 88 years, are appended. This supplements a work published in 1942, ng monthly values for 1866–1940 inclusive. *Subject Headings:* **1. Climatic data 2. Climate oimbra, Portugal 3. Coimbra, Portugal.**—*M.R.*

CLIMATIC CHANGES

See also: **CO_2 theory of climatic change** (Plass), 7.11–17; **Secular changes of standing circulation** (Kraus), 7.11–172; **Climate of China** (Chang), 7.11–283.

7.11–271 551.583:551.311.182

Sokolov, A. A. (*State Hydrol. Inst., Leningrad*), **Umen'shenie prodolzhitel'nosti ledostava iazi s potepleniem klimata.** [Decrease in the duration of river freeze-up in relation to atic warming.] *Priroda*, Moscow, 44(7):96–98, July **1955.** 2 tables, 4 refs. **DLC**— effect of climatic warming, observed since 1900, on the reduction in the duration of freeze- of rivers (from the freezing in late fall to the breakup) could be studied by using as examples Neva River at Leningrad and Kallavesi Lake in Finland, for which long series of uninter- ted observational data are available. These data are presented in two tables showing the iations of the freezing and breakup dates from the mean for the years 1711–1950 (Neva) 1834–1943 (Kallavesi Lake) by days. Especially important deviations occurred after 0. The average freezing date of the Neva River for 1911–1950 differs from the mean of the ceding 200 yrs by 14 days and of the breakup date by 7 days. A similar shortening of the period has been observed on the Lake, where freeze occurred 7 days later and breakup 5 days

earlier. The author assumes that these changes apply to the entire portion of the no part of the U.S.S.R. *Subject Headings:* **1. Freezing of rivers 2. Climatic changes 3. River, U.S.S.R. 4. Kallavesi Lake, Finland.**—*A.M.P.*

7.11–272 551.

Buchinskiĭ, I. E., **Změny podnebí v XIX. a XX. století.** [Variations of climate 19th and 20th centuries.] *Meteorologické Zprávy*, Prague, 8(4):107–108, Aug. **1955.** 2 tables, 2 refs. Ladislav Křivský, translator. **DWB**—Translation of Ch. 4 of his **Ocherki klimata russkoĭ ravniny v istoricheskuiu epokhu** (1954). Temperature and pre tion data for Voroshilovgrad (1838–1951) appear to indicate a fluctuation of climatic with a periodicity of 33 years. *Subject Headings:* **1. Climatic variations 2. Voroshilov U.S.S.R. I. Křivský, Ladislav** (*trans.*)—*G.T.*

7.11–273 551.583.14:551.

Sweeting, M. M., **Recent trends of glacier fluctuations in the North Atlantic area.** London, 175(4448):188–190, Jan. 29, **1955.** 7 refs. **DWB**—Report on British Glacio Society discussion on Nov. 19, 1954. Glacier retreat and wastage in Norway, Iceland, bergen and Greenland are examined in relation to ablation and summer temperature. *Headings:* **1. Climatic trends 2. Glacier fluctuations.**—*C.E.P.B.*

7.11–274 551.583.3:551.31

†Ewing, Maurice and Donn, William L., **A theory of ice ages.** *Science*, Wash., D 123(3207):1061–1066, June 15, **1956.** 2 figs., 45 refs. Also summary, entitled: **Fo glacial advance.** *Science News Letter*, Wash., D. C., 69(26):402, June 30, **1956. DLC** this startling new theory, continental glaciation is associated with an ice-free Arctic C The cycle of glacial and interglacial stages is as follows: Melting of Arctic ice would in interchange of water with North Atlantic. This would favor growth of glaciers by incre precipitation over Arctic and sub-Arctic lands and developing an Arctic low. The lower sea level would decrease exchange of water; this and cooling by ice sheets would reduce perature of Arctic until it froze. This would terminate growth of ice sheets which would away. Sea level would rise and increased circulation would start to melt the sea ice and the cycle again. The theory is supported by a mass of evidence. The first initiati glaciation is attributed to migration of the N. Pole from central Pacific to Arctic. *Headings:* **1. Glacial periods 2. Freezing of seas.**—*C.E.P.B.*

7.11–275 551.583.3(7):550.9:539.16:5

Gross, Hugo, **Die ältesten Spuren des Menschen in Amerika nach den neuesten U suchungen.** [The oldest traces of man in America according to the most recent investigati *Forschungen und Fortschritte*, Berlin, 30(8):232–234, Aug. **1956.** 29 refs. **DLC**—A nu of finds of human activity, including a skeleton of a woman, are dated by C 14 to the Creeks interstadial (*ca* 11,000 B.P.) corresponding to the Alleröd. In the dry S.W. and M City basins pluvial deposits contain burnt bones, dated 8420–9883 B.P. (=Mankato adva An interstadial between early and main Wisconsin glaciations is dated 39,000–23,000 *Subject Headings:* **1. Radiocarbon dating 2. Quaternary climates 3. Prehistory 4. N America.**—*C.E.P.B.*

7.11–276 551.5

Khagemeĭster, E. F., **Lednikovyĭ period i Atlantida.** [Glacial period and Atla *Priroda*, Moscow, 44(7):92–96, July **1955.** fig., 8 refs. Discussion by V. A. Obruchev, p **DLC**—Excavations and investigations made in the Arctic and Antarctic zones establishing fact that a moderate, even warm climate with corresponding vegetation existed in these re in the Tertiary period leads the author to assume that the outlines of the shores and dry distribution were such that waters of the southern current penetrated freely beyond the A circle. There appeared later some sort of impediment which sealed off the warm cur This could only be dry land sections emerging from the sea as volcanic islands which gradu joined together and formed the legendary Atlantis. To confirm his hypothesis of the ap

e and the subsequent submersion of Atlantis, the author cites opinions of Russian and ign geologists. OBRUCHEV states that, according to investigations, the deeps of the North ntic originated comparatively a short time ago and their age coincides with the time of ntis's submersion and the end of the glacial period 10-12 thousand years ago, and ex- sses the hope that further studies of the North Atlantic bottom structure will disclose ruins uildings and other vestiges of ancient culture which will bring to light the real cause of the of the glacial period. *Subject Headings:* **1. Glacial periods 2. Atlantis 3. Climatic nges 4. Arctic.**—*A.M.P.*

7.11–277 551.583.3:551.311.7:529.2

Straka, Herbert, **Die pollenanalytische Datierung von jüngeren Vulkanausbrüchen.** ollen-analysis dating of recent volcanic eruptions.] *Erdkunde*, 10(3):204-216, Aug. **1956.** gs., 2 tables, 98 refs. English summary p. 204. **DWB**—The method of dating late glacial postglacial volcanic eruptions by pollen-analytical investigation and radiocarbon dating eat and lake deposits containing layers of ash is described, with example of the Eifel region. tes of eruptions outside central Europe, especially South and North America, are also wn, in relation to climatic changes. *Subject Headings:* **1. Volcanic eruptions 2. Chronology Quaternary climates.**—*C.E.P.B.*

7.11–278 551.583.3:550.93:546.26

Suess, Hans E., **Absolute chronology of the last glaciation.** *Science*, Wash., D. C., 3(3192):355–357, March 2, **1956.** fig., 2 tables, 20 refs. **DLC**—Radiocarbon dating of sconsin glacial advances in Middle West show 5 periods of colder climate at intervals of 00 years: Post-altithermal, ?3000 B.P.; Cochrane, 6500–7500; Mankato, 10,000–11,000; ry, 13,500–14,500; Tazewell, 17,000-18,000. Titanium content of deep sea sediments ws beginning of last cold period about 80,000 yrs ago, minimum 15,000, after which tem- ature rose rapidly. Minor minimum 55,000 B.P., minor maximum 45,000 B.P. The ve resembles ZEUNER's astronomical sequence. The 40,000 yr period in obliquity of th's orbit shows up well but minima of obliquity precede temperature minima by nearly 000 yrs. *Subject Headings:* **1. Radiocarbon dating 2. Glacial periods.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: **Winds in the Irish Sea** (Edwards, Corby), 7.11–222.

7.11–279 551.584.31:551.515.8

Richardson, W. E., **Temperature differences in the South Tyne Valley, with special erence to the effects of air mass.** *Royal Meteorological Society, Quarterly Journal*, 82(353): 2–348, July **1956.** 3 figs., 4 tables, 6 refs. **DWB**—In 1952–54 thermograph records were ade on the *E* and *W* slopes (1074 ft) and valley floor *V* (998 ft) at Alston, Cumberland. equencies of different relations of maximum and minimum temperatures at *W*, *V* and *E* e tabulated, total and for given air masses, with a view to forecasting. The frequencies air masses are extrapolated to a 12-yr period by BELASCO's data. Some special cases are scussed. *Subject Headings:* **1. Temperature microvariations 2. Valley microclimatology Air mass effects 4. Alston, Cumberland, Eng.**—*C.E.P.B.*

7.11–280 551.584.32:551.524.4:551.524.36

Nocturnal temperature profile above bare soil on clear nights. *Nature*, London, 8(4524):78–79, July 14, **1956.** **DWB**—A discussion of the structure of the nocturnal mperature inversion, with lowest temperature 2 3″ above ground, with special reference to V. LAKE (*R. M. S., Q. J.*, 82(352):187-197, April **1956**; *see* 7.9-238, Sept. 1956, *MAB*). *bject Headings:* **1. Temperature gradient near the ground 2. Minimum temperatures.** -*C.E.P.B.*

7.11–281 551.584.42:551.524.4:551.571.4(431)

Berger-Landefeldt, U.; Kiendl, J. and Danneberg, H., **Beobachtungen des Temperatur- id Feuchtigkeitsgeschehens über Pflanzenbeständen.** [Observations of temperature and

humidity above plant stands.] *Meteorologische Rundschau*, 9(7/8):120-130, July/Aug. 13 figs., 14 refs. **DWB**—The diurnal variation of temperature and vapor pressure wa corded with sensitive electrical apparatus at height of 0.17 to 3.42 m above a field of lu (0.42 m) at Villen and a meadow (0.07 m) on Pfau Island, Wannsee, both near Berlin. Re are shown in a series of graphs and time-height isopleth diagrams. They show irreg diurnal waves of temperature and semidiurnal waves of vapor pressure, amplitude decrea upwards. Small changes of weather type had a considerable influence on the struc The vertical temperature gradient was negative and irregular by day, positive by night vapor pressure gradient the reverse of this. Ground fog and wind disturb the normal gradi *Subject Headings:* **1. Field microclimatology 2. Temperature profiles 3. Humidity pro 4. Berlin, Germany.**—*C.E.P.B.*

7.11–282 551.584.61

Band, G., **Raumklimatische Studien zur Konvektions- und Deckenstrahlungsheiz** [Studies of room climate for convection and ceiling radiant heating.] *Angewandte Mete logie*, Berlin, 2(8):245–253, June **1956.** 7 figs., table, 6 refs. **MH-BH**—Measurement temperature, vapor pressure, cooling power and air movement were made in two roo In one heated by a ceiling radiator there was extensive air unrest; temperature and va pressure decreased from the ceiling downwards. In that heated by convection on one near the floor a circulation was set up, with (away from the stove) more uniform distribu of temperature and vapor pressure. Isoline diagrams show the distributions. Cooling po in the ceiling-heated room varied from 2.72 mgcal/cm²/sec at 3.2 m above the floor to 4.1 0.03 m; in the convection room from 4.20 at 3.2 m to 4.36 at 0.03 m. The occasional fee of discomfort in the ceiling-heated room is attributed to long-wave radiation to the h *Subject Headings:* **1. Room microclimates 2. Heating.**—*C.E.P.B.*

CLIMATIC CLASSIFICATION

See also: **Climate of the central plateau of Spain** (Lange), 7.11–267; **Desert plants** (Went), 7.11–285.

7.11–283 551.585 551.582.3

Chang, Jen-Hu (*Harvard Univ.*), **Climate of China according to the new Thornthw classification.** *Association of American Geographers, Annals*, 45(4):393–403, Dec. 19 8 figs., 18 refs. **DWB, DLC**—The climatic maps of China proper and of Manchuria prepa according to the new (1948) Thornthaite classification are as follows: annual poten evapotranspiration, average annual water surplus, average annual water deficit, mariti index, seasonal variation of effective moisture and summer concentration of thermal efficien The maps were prepared originally on a scale of 1 to 5 million and the climatic data of stations were used. *Subject Headings:* **1. Thornthwaite's classification 2. Climate of Chi 3. Climatic atlases 4. Evapotranspiration 5. China.**—*I.L.D.*

7.11–284 551.5

†Weischet, Wolfgang, **Die räumliche Differenzierung klimatologischer Betrachtungsweis Ein Vorschlag zur Gliederung der Klimatologie und zu ihrer Nomenklatur.** [Spatial diff entiation of climatological viewpoints: a proposal for the classification of climatology and nomenclature.] *Erdkunde*, 10(2):109–122, April **1956.** 4 figs., 47 refs. English summa p. 109. **DWB**—Author regards existing classifications such as macro-, meso- and microclima as unsuitable. A scheme is put forward, based on land forms, into regional, sub-regio local and microclimate, and applied to the Rhine region. Regional climate is illustrated maps of absolute temperature minima 1881–1950 and mean wind force in 1943, sub-regio by radiation minima on Oct. 12, 1952. A detailed tabulation of the terminology, size landscape features, scale for mapping (regional $1:10^6$, sub-regional $1:10^6$–10^5, local $1:5\times10^4$ 5×10^3) and characteristics is given. *Subject Heading:* **1. Climatic classification.**—*C.E.P.B.*

BIOCLIMATOLOGY

See also: **Temp. and life** (Precht et al.), 7.11–11; **Accidents and weather** (Schröder), 7.11–86; **Poliomyelitis** (Dönhardt), 7.11–91; **Multiple electrodermatogram and weather** (Aichinger, Müller), 7.11–92; **Epidemics and weather** (Cordes), 7.11–93; **Weather and climate effect on man** (Jungmann), 7.11–94; **Weather and physiological-psychological interactions** (Mücher), 7.11–95; **Law and weather effects on men** (Reise), 7.11–97; **Medical met. conference** (Schulze), 7.11–98; **Capillary resistance in concussion and weather** (v. Ekesparre), 7.11–99; **Estimate of biological effect of weather** (Zink), 7.11–100.

7.11–285 551.586:551.585.53

Went, Fritz W., **The ecology of desert plants.** *Scientific American*, 192(4):68–75, April 5. 4 photos. **DLC**—After describing the plant species (bushes and annual plants) wing in Death Valley and discussing their manner of germination and growing, the author ws (and this is confirmed by laboratory experiments) that in the desert, as in the jungle—ere lack of space, light, food and water are the normal state of plants—they share, and share ce, and if there is not enough for all of them to grow tall and strong, they all remain smaller, do not wage war. Competition and selection of plants does occur during germination. *bject Headings:* **1. Desert bioclimatology 2. Desert ecology 3. Death Valley, Calif.**—*M.P.*

7.11–286 551.586:615.838(491)

Lampert, H., **Balneologische Aufgaben in Island.** [Balneological problems in Iceland.] *Varforschung*, Ser. 3, 24(1/2):295–297, 1954. pub. **1956. DWB**—The natural spas of land were investigated during journeys and by sending patients with rheumatism or recovering from infantile paralysis. The hot springs in the lowlands are sulphurous, those on e edge of the plateau and mountains contain carbonate of iron. There is also sulphur-pregnated mud. The hot water is used for heating rooms and cooking. Hveragardi is a ll developed spa. *Subject Headings:* **1. Balneology 2. Iceland.**—*C.E.P.B.*

7.11–287 551.586:616.9(8)

Brazol, Demetrio, **Enfermedades tropicales originadas por el clima en el continente damericano.** [Tropical diseases originated by climate in the South American continent.] *eteoros*, Buenos Aires, 5(4):323–344, Oct./Dec. **1955.** 3 figs., 2 tables, 16 refs. Spanish d English summaries p. 323. **DWB**—Tropical diseases controlled by climate which favors e multiplication of microorganisms and parasites in hot, humid regions of the South American ntinent are reviewed in form of concise statements concerning their more important features. ese are virus, rickettsial, spirochetal, bacterial, mycotic, protozoal, helminthic, nervous and tritional diseases. Their endemic state is probably determined by six-months isochrones heat and by the isotherms of equivalent temperature of 60°C. The twelve-months isochrones denote hot, wet tropics ranking among the most unhealthy climatic regions especially for spreading of tropical diseases. *Subject Headings:* **1. Tropical bioclimatology 2. Tropical seases 3. South America.**—*Author's abstract.*

7.11–288 551.586:91.04(213)

Grober, Julius, **Triennium Bioclimaticum Tropicale (TBT), 3.** [Tropical bioclimatic ennium, Pt. 3.] *Forschungen und Fortschritte*, Berlin, 30(6):164–167, June **1956.** Also: oli, Harald, **Programm limnologischer Untersuchungen im Rahmen des TBT.** [Program limnological investigations in the TBT.] *Ibid.*, p. 167–169. **DLC**—In this further report ROBER discusses questions of location, personnel and nature of stations and gives programs r geography, geology, meteorology and climatology, botany, zoology and medicine. The eteorological program envisages a first order station in every investigation region, 2nd class ations, and 3rd class stations for all those places for which microclimate data are required r other studies. It also includes air movements and cyclones, sultriness zones and seasonal ift of weather belts. SIOLI points out that lakes play a great part in the tropical rain-forest. is program includes physics, chemistry, climatology and biology of springs and lakes at

different heights in humid and arid regions. *Subject Headings:* **1. Bioclimatology 2. Tro... triennium.**—*C.E.P.B.*

ENVIRONMENTAL INFLUENCES

See: **Forest met. and climatology** (Krečmer), 7.11–84; **Ventilation of Oxford Circus** (Whiten), **7.11–154.**

SYNOPTIC CLIMATOLOGY

See also: **Synoptic processes—Atlantic Ocean, Eurasia** (Isaev), 7.11–9.

7.11–289 551.589:55...

Müller-Annen, H., **Die Witterung Mitteleuropas im Rahmen der Zirkulation der N... halbkugel.** [The weather of Central Europe in the circulation of the Northern Hemisph... *Zeitschrift für Meteorologie*, 10(2):39–52, Feb. **1956.** 9 figs., 12 tables, 12 refs. **DLC**—N... monthly values, amplitudes and phases of annual variation, and persistence of the zonal in... (N. Hemisphere, W and E halves) and hemisphere levels of 500 and 1000 mb are tabula... Variations of the index are periodic (2.3 to 44–45 years) and are similar to variations of pres... 8 years before. These relations are set out schematically, including relations to sunsp... and extrapolated to 1970. The correlation factors between the zonal parameters (hemisph... W and E index and pressure) are related to the weather characteristics of Central Eu... (dry, wet, cold, warm) in each month. The relations in Jan. and July are then examined m... closely with the help of scatter diagrams. Singularities should be examined in different ty... of circulation. *Subject Headings:* **1. Synoptic climatology 2. Zonal circulation.**—*C.E.P.B.*

MISCELLANEOUS

SOLAR INFLUENCES

See also: **Solar activity and electrical wave propagation** (Hachenberg), 7.11–6; **Effective recombination coeff. in E and F1 layers** (Minnis), 7.11–162.

7.11–290 551.590.24:551.510...

Banerjee, D. K.; Surange, P. G. and Sharma, S. K. (all, *Engr. Col., Banaras Hindu Un...* **Ionospheric observations at Banaras during the total solar eclipse on June 20, 1955.** *Jour... of Scientific and Industrial Research, Sec. A*, 14(11):517–521, Nov. **1955.** 5 figs., 17 r... **DWB**—Observations of intensity of radio signals on 30.5 and 30.7 m from Colombo and D... were made at Banaras during the total eclipse at Colombo, to see what effect the totality ... on the ionosphere. Oblique and vertical incidence measurements gave data on variation... field strength, electron density, semithickness and height of lower boundary of F2 lay... Conclusions were: 1) duration of eclipse is less than that of ionospheric eclipse; 2) effect... absorbing regions in lower ionosphere is more pronounced in the eclipse area than at De... 3) field strength of Colombo signals increased and at Delhi decreased during eclipse. Fina... it was concluded that the sudden increase in solar radiation at end of eclipse produced therm... expansion of the ionized layer. *Subject Headings:* **1. Eclipse effects on ionosphere 2. So... eclipse, June, 1955 3. Banaras, India 4. Colombo, Ceylon.**—*M.R.*

7.11–291 551.590.25:621...

Forsyth, P. A. and Vogan, E. L., **Forward-scattering of radio waves by meteor tra...** *Canadian Journal of Physics*, Ottawa, 33(5):176–188, May **1955.** 7 figs. (incl. photo... table, 15 refs. **DWB**—Radio waves which are too high in frequency to be reflected by ... ionospheric layers are often reflected back to the earth's surface by the ionization in mete... trails, and may be detected at distances of the order of 1000 km from the transmitting stati... These forward-scattered signals have been studied by the use of several transmission paths... Canada. The paper summarizes the characteristics of the individual signals and prese... some preliminary results of the investigation. It seems likely that the technique will pro...

be useful in meteoric studies. *Subject Headings:* **1. Radio wave reflection by meteor trails Canada.**—*Authors' abstract.*

7.11–292 551.590.25:546.17

Hawkins, Gerald S. and Cook Allan F., **Inadequacy of recombination as the source of ht from enduring meteor trains.** *Nature*, London, 178(4525):161–162, July 21, **1956.** ble, 6 refs., 3 eqs. **DWB**—The luminosities per cm length due to recombination of ions d electrons in the trains of Perseids and Geminids 1 sec after formation are calculated as 22 and 3.82, respectively, but the luminosity observed visually is about 400. A possible ternative cause of the luminosity is the formation of active nitrogen which afterwards excites utral meteor atoms in the train. *Subject Headings:* **1. Meteor trails 2. Atomic nitrogen.** *C.E.P.B.*

7.11–293 551.590.25

Kropachev, A. M. and Pankevich, N. A. (*Molotov Gosud. Univ.*), **Dva iarkikh bolida.** [Two bright fireballs.] *Priroda*, Moscow, 44(9):115, Sept. **1955. DLC**—A description of o fireballs observed at Berezniki, Molotov Oblast in Dec. 1954 and at Tomazu, Sakhalin blast in Dec. 1953. *Subject Headings:* **1. Fireballs 2. Russia.**—*I.L.D.*

7.11–294 551.590.25:551.510.535

Neužil, L. (*Centr. Astron. Inst., Ondrejov*), **Influences météoriques sur la couche sporadique**. [Effects of meteors on the sporadic E layer.] *Bulletin of the Astronomical Institutes of zechoslovakia*, Prague, 3(3):40–43, May **1952.** 2 figs., 6 refs. **DLC**—In a series of measure- ents made at Freiburg, the author finds evidence of an effect of meteor showers, such as the erseid and Orionid, on the sporadic E layer, appearing as a marked increase in critical fre- uencies. *Subject Headings:* **1. Meteor influences 2. Sporadic E layer.**—*Trans. of author's bstract.*

VISIBILITY

See: **Restricted morning visibility** (Johnson et al.), 7.11–74; **Haze and wind direction** (Reidat), **7.11–153.**

OPTICAL PHENOMENA

7.11–295 551.593

†Hulburt, E. O. (*Naval Res. Lab., Wash., D. C.*), **Some recent papers in the Journal of he Optical Society of America.** *Optical Society of America, Journal*, 46(1):5–9, Jan. **1955. DWB, DLC**—Among a number of papers which the author considered of unusual interest are ncluded: Cox and Munk's paper on measurement of roughness of the sea surface from photo- raphs of the sun's glitter, and the author's paper on meteorological optics (Feb. 1953) of the wilight sky. These are discussed in a casual but pertinent manner. *Subject Headings:* **. Atmospheric optics 2. Optical papers 3. Optical Society of America, Journal.**—*M.R.*

7.11–296 551.593.54:551.510.52/3

Darling, G. and Ludlam, F. H., **Curious sunset.** *Weather*, 11(6):204–205, June **1956. DWB**—Darling describes a filmy cloud over Kent on April 22, 1956, which glowed white for .5 min. after sunset. Ludlam thinks it was a haze layer at about 45,000 ft, either volcanic lust from Alaska or of cosmic origin. *Subject Headings:* **1. Haze layers aloft 2. Kent, Eng.** —*C.E.P.B.*

7.11–297 551.593.54/5(688)

Hoffmeister, C., **Die atmosphärisch-optische Störung vom Jahre 1953. (Ergebnisse ler Beobachtungen in Südwestafrika 1952–53, Vierte Mitteilung).** [The atmospheric-optical disturbance of 1953: results of observations in S.W. Africa 1952–53, Pt. 4.] *Zeitschrift für Meteorologie*, Berlin, 10(3):76–86, March **1956.** 4 figs., tables, 21 refs. **DLC**—An abnormal ncrease of twilight coloration began on April 3 and reached a maximum in mid-April, bathing the landscape with orange light and blue shadows. It gradually decreased in May and dis-

appeared in June. It was due to a dust layer with top almost constant at about 14.75 Observations were made of ratios of yellow, orange and red to blue, and of zenith polariza at sun heights +15 to −6°, showing disturbance of Arago's neutral point. The heigh earth-shadow segments and diameter of circum-solar disk were measured. A slight recurre was seen later in the N. Hemisphere. The cause is uncertain, but may have been cosmic d *Subject Headings:* **1. Haze layers aloft 2. Skylight color 3. South-West Africa.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

See also: **Ionosphere** (Goutier), 7.11–25; **Met. observations** (Kalm), 7.11–52; **Proc. Inst. Radio Engineers,** 7.11–60; **Fine structure of atmos. electric field** (Kühn), 7.11–134; **Radio wave propagation in upper ionosphere** (Ellis), 7.11–158; **Electron resonance in ionospheric waves** (Hines), 7.11–159.

7.11–298 551.594.11 :551.59

Whitlock, W. S. and Chalmers, J. Alan, **Short-period variations in the atmosphe electric potential gradient.** *Royal Meteorological Society, Quarterly Journal,* 82(353):325–3 July **1956.** 12 figs., 15 refs. **DWB**—Simultaneous autographic measurements of poten gradient were made at two sites at Durham University Observatory 100 m apart along run of the wind. Measurements of sky brightness, wind speed and point discharge w added. Some observations at points 960 m apart were also made. The records from two sites were generally similar, with a lag due to wind at 10 m multiplied by a factor averag 1.25. In fine weather the average change U from one minute to the next was 2.9% but w occasional 100% pulses. In fair weather with Cu or Acu U was 12.8% increasing with wi speed. There were occasional cusps associated with pockets of charge sometimes due locomotive steam or convection, but not related to presence of clouds. In mist, fog or overc sky p.g. was often negative. With rain, snow and sleet there were rapid variations. W showers variation agreed with that of cloud brightness and there was point discharge wh destroyed all pattern; some special cases are discussed. *Subject Headings:* **1. Potential gradie variations 2. Durham, Eng.**—*C.E.P.B.*

7.11–299 551.594.14 :662.2 :53

Blifford, I. H., Jr.; Friedman, H.; Lockhart, L. B., Jr. and Baus, R. A., **Geographic and time distribution of radioactivity in the air.** *Journal of Atmospheric and Terrestr Physics,* London, 9(1):1–17, July **1956.** 9 figs., table, 6 refs. **DWB**—Continuous measuremen of radioactivity have been made for various periods during 1950–1954 at 15 widely distribut places. The geographical distribution of natural radon and thoron and variations of rad in 1950 are discussed. Fission products can be distinguished from natural radioactivity rate of decay. In curves of fission product beta activity at Washington in 1950–55 all exce British test explosions were identified, and activity was observed on over 70% of days. T highest recorded was 6×10^{-16} curie/cc at San Diego following Nevada tests of Feb. 195 Atomic explosion products are rapidly dissipated but thermonuclear explosions form a pe sistent reservoir of radioactivity in the stratosphere. *Subject Headings:* **1. Radioactivity the atmosphere 2. Atomic explosion effects.**—*C.E.P.B.*

7.11–300 551.594.21 :551.501.81 :551.515.4

Reynolds, S. E. and Brook, M., **Correlation of the initial electric field and the radar ec in thunderstorms.** *Journal of Meteorology,* 13(4):376–380, Aug. **1956.** 5 figs., 5 refs. **DWB**— A 3 cm radar and time-lapse camera on St. Augustine Plain and an electric field meter Mt. Withington (10,270 ft) were operated in conjunction in 1954. Results during 5 storm are plotted. They "show that precipitation is a necessary, but not sufficient, condition f the onset of thunderstorm electrification." When the radar echo shows rapid vertical develo ment however, initial electrification almost coincides with the initial precipitation ech When no precipitation echoes were present, only fair-weather positive fields were observed ev in clouds in active convection. *Subject Headings:* **1. Thunderstorm electricity 2. Rad echoes from thunderstorms.**—*C.E.P.B.*

7.11–301 551.594.221:551.596

Ashmore, S. E., **The sounds associated with lightning.** *Weather*, 11(8):269, Aug. **1956.** **MH-BH**—A large number of accounts of the 'vit' or 'click' associated with lightning include two sound on the radio a split *second* before the flash. *Subject Heading:* **1. Lightning sounds.** —*C.E.P.B.*

7.11–302 551.594.221:629.13

Stark, R. G., **Aircraft lightning.** *Weather*, 8(12):385, Dec. **1953.** **MH-BH**—On a flight m London to Shannon in thin stratus, a brilliant flash started at the nose and immediately ead to both wings, and a loud explosion was heard in the cockpit. *Subject Heading:* **1. Lightg on aircraft.**—*C.E.P.B.*

7.11–303 551.594.223:551.515.3

Malsch, W., **Beobachtung einer schwachen Trombe und eines Kügelblitzes.** [Observan of a weak tornado and ball lightning.] *Meteorologische Rundschau*, 9(7/8):150, July/g. **1956.** 2 figs. **DWB**—On May 24, 1956, in old Mc air heavy CuNb developed quickly d gave thunderstorms over Karlsruhe. At 14½ h a weak tornado was accompanied by ball htning which struck an old horse chestnut tearing away some of the bark. *Subject Heading:* **Ball lightning.**—*C.E.P.B.*

AURORAS

7.11–304 551.594.51:551.521.4:546.21

†Branscomb, L. M. and Smith, S. J., **Negative oxygen ions in the upper atmosphere: the inity and radiative attachment coefficient of atomic oxygen.** *American Geophysical Union, ansactions*, 36(5):755–758, Oct. **1955.** fig., eqs., 20 refs. **DWB, DLC**—The influence of gative ions of atomic oxygen on the physics of the ionosphere and night airglow is re-examined the light of new experimental determinations of the oxygen affinity (1.48±0.10 ev) and otodetachment cross section. The radiative attachment coefficient is calculated from the otodetachment cross section. There is no evidence of a resonance at the threshold, where e attachment coefficient is approximately 1.2×10^{-15} cm³/sec. *Subject Headings:* **1. Auroral ysics 2. Night airglow 3. Atomic oxygen.**—*Authors' abstract.*

7.11–305 551.594.51:551.521.7

Omholt, A., **Characteristics of auroras caused by angular dispersed protons.** *Journal Atmospheric and Terrestrial Physics*, London, 9(1):18–27, July **1956.** 3 figs., table, 29 refs., 3 eqs. **DWB**—CHAMBERLAIN's proposal that auroral arcs are caused by monoenergetic otons with a certain dispersion in direction is considered. Calculations are carried out on the minosity curves of the main auroral features and of the Balmer lines, and on the Doppler ofile of these latter viewed in the direction of the magnetic horizon. For the main features e computed luminosity curves are in moderate accord with the observed. Reliable observaons are lacking in the case of the Balmer lines. According to the calculations, these lines ould become narrower as the altitude within an aurora is decreased. The computed profiles e not in agreement with the observed, unless the recorded light originated from the lowest rt of each of the auroras studied. *Subject Headings:* **1. Auroral particles 2. Solar protons.** —*Author's abstract.*

7.11–306 551.594.51:546.17

†Omholt, A., **Secondary processes due to absorption of the Lyman lines emitted from urorae.** *Journal of Atmospheric and Terrestrial Physics*, London, 9(1):28–35, July **1956.** tables, 33 refs., 22 eqs. **DWB**—The processes considered are the ionization of nitric oxide in e lower ionosphere by the HLα line, and the excitation of O Iλ 8446 by resonance absorption f the HLβ line. Comparison with the intensity of HLα emitted from the quiescent sun ggests that HLα emitted from aurora may give an appreciable contribution to the ionization, ut not the full amount required for polar blackouts. The excitation of O Iλ 8446 by absorpon of HLβ is found to be unimportant in ordinary aurorae. *Subject Headings:* **1. Auroral itrogen lines 2. Auroral physics.**—*Author's abstract.*

7.11–307 551.594.5

Griffing, G. W. and Stewart, A. L. (*Queen's Univ. of Belfast, Dept. of Appl. Math.*), **effect of the horizontal extent of aurorae on the apparent luminosity-altitude curves.** *Jour of Atmospheric and Terrestrial Physics*, London, 4(6):339–341, **1954.** fig., 8 refs., 3 eqs. **D** —A suspected effect (Meinel, 1952) of the finite horizontal spread of auroras along the g magnetic meridian in concealing the time intensity-altitude distribution is investigated th retically; and a comparison is made between computed and observed (Harang, 1944) di for the variation of luminosity with height, observed intensities agree with those predicted theoretical grounds except when the ratio, horizontal/vertical extent of the aurora is much which is unlikely. Thus the finite horizontal spread of the aurora cannot explain the exist discrepancy between observed and predicted intensities, if the latter is based on the assumpt of excitation by mono-energetic protons. *Subject Heading:* **1. Auroral luminosity-altitu curves.**—*Physics Abstracts, No. 6187, 1954.*

SFERICS

7.11–308 551.59

Chapman, F. W. and Macario, R. C. V., **Propagation of audiofrequency radio waves great distances.** *Nature*, London, 177(4516):930–933, May 19, **1956.** 4 figs., 13 refs. **DV** —The main energy of atmospherics is in audio-frequency band <10 kc/s, with high attenuat about 2 kc/s. Higher frequency components move faster than lower frequencies, leavin slow tail. Spectrometer measurements on magnetic tape, which also contains a record thunderstorms, are described. A model of relative amplitudes of frequency components different distances, 200–2000 km, is shown. The main contribution to signal strength $E(f$ is represented by $A(f)r^{\frac{1}{2}}\exp[-\alpha(f)r]$ (f, frequency; r, distance). Plots for a number frequencies at different distances are given. Day and night attenuations for propagation ov ground are compared with theoretical values. *Subject Headings:* **1. Sferics from lightni 2. Sferics propagation.**—*C.E.P.B.*

7.11–309 551.594

Goldberg, Philip A., **Electromagnetic phenomena of natural origin in the 1.0–150 c./s. ban** *Nature*, London, 177(4522):1219–1220, June 30, **1956.** 3 figs., 2 refs. **DWB**—Summ observations in eastern Oregon of vertical and N-S horizontal field components showed th low-frequency activity was made up of about 20 bursts per sec., each lasting 4–10 mse of about 10^{-8} gauss in the vertical field and 3×10^{-7} in the N-S field. The signal level was a minimum about 7 h WMT, a strong maximum at 14–16 h, a secondary minimum at 21–22 and a weak secondary maximum at 23–1 h. Probably due to lightning. *Subject Headin* **1. Sferics.**—*C.E.P.B.*

ACOUSTICAL PHENOMENA

See: **Anomalous sound propagation** (Murgatroyd), 7.11–205; **Lightning sounds** (Ashmore), 7.11–301.

PART II. ANNOTATED BIBLIOGRAPHY ON TROPICAL CYCLONE THEORY

By: *Wilhelm Nupen*

In this bibliography (the third in a series on various aspects of hurricanes, typhoons and tropical cyclones prepared for, and with support from, the U. S. Weather Bureau and the National Hurricane Research Project) about 200 abstracts or references to material on the theoretical and forecasting aspects, and a few more general works (which were omitted from the first of the series) are assembled. A number of less important but recent items which would normally be run in the hurricane section of Part I (Current Abstracts) are also included in order to bring them together with the other material on tropical cyclones for the benefit of anyone wishing to compile an exhaustive file of hurricane literature references.

Material on the practical aspects of hurricane research and development (tides, floods, wind damage, warnings, etc.) will be found in the preceding (October 1956) issue of *MAB*. The more important general and some of the theoretical works are included in the Sept. 1956 issue. In all of the bibliographies about 600 (out of over 1500 references compiled at the beginning of the project) are included. These 600 items were to have been run in two bibliographies, but time and space considerations made it advisable to cut down the size of the first two and to run the remainder of the 501-600 items as a supplement in this, the third of the series. Eventually it is hoped that the many excellent case histories of typhoons, hurricanes and miscellaneous tropical cyclones omitted from the three compilations, can be made the subject of 3 or 4 more special bibliographies on the regional and synoptic aspects. These, when collated, would give a pretty fair coverage, both regional and subject-wise, of the rich literature on tropical cyclones now available.

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1840–1847

7K–1 551.515.2

Tracy, Charles, **On the rotary action of storms.** *American Journal of Science and Arts,* 45:65–72, ct. **1843. DLC**—Reprinted in: *Smithsonian Miscellaneous Collections,* Wash., D. C., 51(4):16–22, **10.** 5 figs., table. **DLC**—REDFIELD and REID have accumulated a vast amount of evidence dicating that there is both rotary and progressive motion in large storms and in tornadoes, the rection of rotation being counterclockwise in the northern and clockwise in the Southern Hemi here. ESPY has advanced the hypothesis of converging currents and a central ascending column rarefied air. In this paper a simple geometrical and mathematical model of rotary storms is rived from converging currents deflected by the earth's rotation. This model in effect combines EDFIELD's rotary theory with ESPY's theory of converging currents and entrainment. TRACY tributes hurricanes to local differential heating in oceanic areas sprinkled with island heat sources uch as the West Indies). He also provides a table showing the effect of the deflective force of the rth's rotation (dependent on the cosine of the lat.) for differences of 1° of lat. between 2° and 43° t., and another for every 1 mile of northward movement between 10° and 45° N. *Subject Headings:* **Hurricane theory 2. Coriolis effect on hurricane winds 3. Tracy's cyclone model.**—*G.T.* and *R.R.*

7K–2 551.515.2

Keller, F. A. E., **Des ouragans, tornados, typhons et tempetes.** [On hurricanes, torna typhoons and storms.] *Annales Maritimes et Coloniales*, Paris, Vol. 32, Partie non-officielle 2:321–341, **1847.** foot-refs. fig. (fold.). Also his: **Errata et additions au premier memoir M. Keller.** [Errata and additions to the first paper of Mr. Keller.] *France. Service H graphie de la Marine, Annales Hydrographiques*, 1:446–447, **1848.** Also his: **Des typhons de l des ouragans obliques et des coups de vent fixe, etc.** [Typhoons of 1848; tilted hurricanes, tionary gales, etc.] *Ibid.*, [*Ann. Hydr.*] p. 211–252. tables. **DLC**—The known laws of struc movement and recurvature of hurricanes, typhoons and tropical cyclones in various parts of earth are summarized concisely and the theory held that their formation occurs where two oppo currents, one the trade winds, and the other the westerlies, rub together. This occurs at 30° N only in the late summer, but as the sun moves southward the place of origin and path also m south. Rules for mariners are set forth with great precision and applied to the actual hurrican 1848. In the supplement, the major disastrous typhoons of Shanghai-Formosa (July) and H Kong-Macao (Sept.) and Canton (Oct.) are reported in all details. *Subject Headings:* **1. Tro storms 2. Navigation in cyclonic storms 3. Typhoons, China Coast (1847) 4. China Coast.**—*M*

1852

7K–3 551.5

Martin, F. P. B., **A memoir on the equinoctial storms of March–April 1850; an enquiry the extent to which the rotary theory may be applied.** London, **1852.** 203 p. Numerous ta and charts (fold.) at end of book. **DWB**—This early attempt to find a solution to the princi governing cyclones was based on direct observations conducted by the author near Dorchester, E during Feb.–April, 1850. Comparison with ship observation and other available data enable approximate retrospective view into behavior and movements of the numerous storms tabulate as to derive facts on the rotary movement and on the progressive movement of cyclones, and plication of this knowledge to navigation. *Subject Headings:* **1. Hurricane theory 2. Hurric tracks.**—*W.N.*

1890–1896

7K–4 551.5

von Bezold, Wilhelm, **Theorie der Cyklonen.** [Theory of cyclones.] *Akademie der Wis schaften, Berlin, Sitzungsberichte*, **1890,** p. 1295-1317. original unchecked. **DLC**—"Trans. English from its Gesammelte Abhandlungen, **1906,** p. 284–305" and issued in: *Smithsonian Mis laneous Collections*, Wash., D. C., 51(4):344–365, **1910.** fig., foot-refs., 11 eqs. **DLC**—The the of centered whirls (i.e., cyclones with winds tangential to the isobars) is analyzed mathematica The case considered is that of barometric gradients directed inward, circular isobars and cyclo motion. The theory developed is applied to tornadoes (waterspouts) and tropical cyclones w particular attention to the mechanism of their centers. *Subject Heading:* **1. Cyclone theory.**—*C.*

7K–5 551.515.2(26

Dallas, W. L., **An account of a storm developed in equatorial regions.** *India. Meteorolog Department, Memoirs*, V. 6:215–236, **1896.** tables, 18 plates. Also: Abbe, Cleveland, **The or of typhoons and hurricanes.** *Monthly Weather Review*, 24:417–418, Nov. **1896. DWB**—Sh observations of a cyclone which occurred in equatorial latitudes over the Bay of Bengal (Dec. 1– 1894) are tabulated and analyzed from the point of view of the theories of FERREL and DAVIS (t perature inequality causing radial flow which is modified into gyratory motion by earth's rotatio The cyclone is of particular interest in that it formed over the equator and thus gave occasion studying the transition from radial flow over the equator (as postulated by the Ferrel-Davis the and confirmed by observation) to gyratory motion in higher latitudes. The storm is also discus from the point of view of the theory of cyclogenesis based on evaporation and condensation proces (Eliot). Among the peculiarities of the storm the author mentions (1) torrential rain apparen associated with trans-equatorial air flow and (2) the sharply defined limits of the disturban ABBE's review includes a summary of DALLAS' conclusions. *Subject Headings:* **1. Hurricane form tion 2. Ferrel theory 3. Air flow across equator 4. Cyclone, Bay of Bengal (1894).**—*G.T.*

1900–1908

7K–6 551.515

Cordeiro, F. J. B., **Tropical hurricanes.** *American Geographical Society, Bulletin*, 32(3):24 259, **1900.** 6 figs., eqs. **DWB**—Hurricane formation is discussed as a function of solar he Some of the statements are: 1) hurricanes always originate in the doldrums; 2) a "low" (as a funct of difference in specific heat between land and sea) may well give rise to a hurricane. A brief mat matical analysis explains the gyroscopic movements and tracks of hurricanes. *Subject Headin* **1. Hurricane theory 2. Solar influences 3. Hurricane tracks.**—*W.N.*

7K–7 551.515.2

Margules, Max, **Über die Energie der Stürme.** [On the energy of storms.] *Austria. Zentralanst für Meteorologie und Geodynamik, Jahrbuch*, Vol. 40, 1903. pub. **1905.** 26 p. Original not checked.—Trans. into English in *Smithsonian Miscellaneous Collections*, Wash., D. C., 51(4):533–595. **1910.** figs., foot-refs., numerous eqs. **DLC**—The energy supply of storms is calculated in a detailed mathematical analysis involving such factors as force of gravity, deflecting force due to rotation of earth, elastic pressure within the air, vertical temperature distribution, frictional forces, quantity of heat added to the closed system, etc. Potential energy in air masses with strong vertical gradients is found to be the source of supply of kinetic energy of storms while "the horizontal distribution of pressure appears as a translation of the driving power of the storm." *Subject Headings:* **1. Cyclone theory 2. Cyclone energy 2. Margules' theory.**—*G.T.*

7K–8 551.515.23:551.43

Abbe, Cleveland, **Hurricanes affected by mountain ranges.** *Monthly Weather Review*, 36:411, Aug. **1908. DWB**—Discusses briefly the influence of mountains on the path of hurricanes. Some storms apparently are influenced and others not by the east-west ranges in the West Indian Islands and the northeast-southwest Appalachian range. *Subject Headings:* **1. Hurricane tracks 2. Orographic effects on hurricanes.**—*W.N.*

7K–9 551.515.2:551.576(512.317)

§Figg, F. G., **Report [on the typhoon of 27th 28th July, 1908].** *Hong Kong Government Gazette, Supplement*, No. 17:446–450, Sept. 18, **1908.** 2 charts. **DWB**—This brief report from the Hong Kong Observatory lacks data on origin of the typhoon which supposedly formed on the July 25, east of Balingtal Channel. Existence of storm was detected by clouds (in absence of early barometric indications) and swell. The cloudless sky in the morning became almost covered by cirro-stratus at approximately 30° except the still clear N.W. horizon where some few patches of alto-cumulus show it moved in from NE by E in the afternoon (after 4 p.m.) and shifted NE by N at 6 p.m. when the hurricane warning was hoisted. *Subject Headings:* **1. Typhoon clouds 2. Typhoon, Hong Kong (1908) 3. Hong Kong.**—*W.N.*

1911–1917

7K–10 551.54

Krebs, Wilhelm, **The lowest barometric minima at sea level.** *Monthly Weather Review*, 39(3):[illegible], March **1911.** table. **DLC**—The results of 8 observations are tabulated giving: place, location, date, pressure (in. and mm) and authority. The pressures vary between 24.76 on the coastal lowland of N.E. Madagascar, Feb. 3, 1899 to 27.08 on the coastal lowland of Orissa, Sept. 22, 1885. *Subject Headings:* **1. Barometric minima 2. Madagascar.**—*W.N.*

7K–11 551.515.2:551.577.37(51)

Chu, Coching, **Distribution of precipitation in China during the typhoons of the summer of 1.** *Monthly Weather Review*, 44:446–450, Aug. **1916.** 9 figs., 2 tables, 7 refs. **DLC**—Analytical results of this study of the tracks of 5 storms are presented in tables and discussed. Conclusions drawn are: 1) rainfall distribution in a tropical storm is uniform in comparison with extratropical, 2) heaviest rain usually occurs where storm passes coast from sea to land, 3) no decrease of speed is observed and 4) heaviest precipitation usually occurs along the trajectory. *Subject Headings:* **1. Typhoon rainfall 2. China.**—*W.N.*

7K–12 551.509.52:551.515.2(729)

Hall, Maxwell, **West Indies hurricanes as observed in Jamaica.** *Monthly Weather Review*, 45(12):578–588, Dec. **1917.** 9 figs., 8 tables, 11 refs., 7 eqs. **DWB**—A descriptive characterization of hurricanes is given as a guide to observers in the West Indies, the author quotes and comments on 19 "rules" from ABERCROMBY (1887), with respect to behavior of hurricanes: their structure, resemblance to or difference from extratropical cyclones, effects of rough land masses, tracks, secondaries, high clouds, high temperature, humidity, rain and thunderstorms in advance of cyclone; pressure and wind gradients, squalls, calm area, troughs, etc., and application of rules to hurricanes of Aug. 12, 1915 and Aug. 15, 1916 in Jamaica. The author's comments, graphical aids and mathematical treatment make this paper unusually valuable for the forecaster as well as the observer, being based as it is on long experience and scholarly background. *Subject Headings:* **1. West Indian hurricanes 2. Hurricane forecasting 3. West Indies.**—*M.R.*

1922–1924

7K–13 551.515.23(729)

Bowie, E. H., **The formation and movement of West Indian hurricanes.** *American Meteorological Society, Bulletin*, 3(6):95–96, July–Aug., **1922. DLC**—Two of the explanations discussed

briefly are 1) local superheating and 2) the counter current theory, the latter of which is favore the author. Cyclones do not move with the general winds of the region but may well be gove by the general wind system at intermediate heights. *Subject Headings:* **1. Hurricane forma 2. West Indian hurricanes 3. West Indies.**—*W.N.*

7K–14 551.5

§McAdie, Alexander George, **The steering line of hurricanes.** *American Geophysical Un Transactions*, 3(17) Pt. 2:102–108, **1922.** 4 figs., 5 refs. **DLC**—This brief analytical review of path of a hurricane of 15–21 Oct., **1910** seems to favor BJERKNES and the Bergen school's theory cyclonic behavior. The two identified surges controlling path of hurricanes from the Caribb Sea to the North Atlantic are: (1) a Nichikun high and (2) the Labrador high, which may be port of what BJERKNES has called "the polar front." *Subject Headings:* **1. Hurricane theory 2. Hu cane tracks.**—*W.N.*

7K–15 551.5

Okada, T., **On the eye of the storm.** *Kobe, Japan. Imperial Marine Observatory, Mem* 1(1):27–36, **1922.** fig., 5 tables, 5 refs. **DWB**—Detailed accounts on the eye of several storm observed in Japan and neighboring waters are given along with tabulated data. Some princ factors of the eye of storms are discussed. Excessive temperatures and dryness are not conside essential characteristics of the eye, hence its gentle descending air current is not the essential fea in the mechanics of typhoons, either. *Subject Headings:* **1. Typhoon structure 2. Eye of typh 3. Japan.**—*W.N.*

7K–16 551.515.2(2

Marvin, Charles F., **Why are typhoons in China Sea more frequent than West Indian hurrican** *Monthly Weather Review*, 51:407, **1923.** **DWB**—Brief remarks to the effect that more prolon occurrence in Pacific and China Sea of opposing wind systems flanking tropical calms accounts greater frequency of tropical cyclones in those regions than in the Caribbean. (*Same item as* 4I– Sept. 1953, *MAB.*) *Subject Headings:* **1. Tropical cyclone distribution 2. China Sea 3. Caribb Sea.**—*M. P. Kramer.*

7K–17 551.515

Brunt, D., **The origin of tropical revolving storms.** *Marine Observer*, 1(9):113–115, Sept. 19 **DWB**—If a certain volume of air moves upward it will be replaced by in-moving air which, due deviating force of the earth's rotation, will have to swing around toward the right or in other wo acquire a counterclockwise direction. The vertically upward moving air may be horizonta moved off by strong currents aloft. Conditions favoring such air movements are frequently regions where hurricanes are born. *Subject Heading:* **1. Hurricane formation.**—*W.N.*

7K–18 551.51

Chu, Co-ching, **A new classification of typhoons of the Far East.** *Monthly Weather Revi* 52:270–579, Dec. **1924.** 7 figs., 5 tables, 23 refs. **DWB**—The term typhoon is defined. A h torical review of typhoon classification is given, and a new classification system outlined. D tribution and characteristics of each typhoon are discussed. Charts of composite tracks of typho of different months, 1904–1915, are drawn. Area covered by the report includes China, Jap Indochina, the Philippines, the Pacific and the China Sea. *Subject Heading:* **1. Typhoon classificati** —*H. P. Kramer.*

7K–19 551.51

Kochin, N. E. (*Leningrad Geophysical Obs.*), **Teoriticheskaia model' peremeshchaiushchego tsiklona.** [Theoretical model of a moving cyclone.] *Zhurnal Geofisiki i Meteorologii*, 1(1):47– **1924.** 24 figs., table, refs., eqs. **DLC**—A detailed and classical model of a moving cyclone worked out numerically following Lord RAYLEIGH (1917–1919), SHAW (1918) and FRIDMAN (19 and using the basic hydrodynamic equations and entering actual values from observed cases. author works out the isobars, isosteres, trajectories of air particles and of the cyclone, ther dynamic quantities involved, etc., for the baroclinic case. The model extends up to 2 km. *Sub Headings:* **1. Cyclone models 2. Cyclone theory.**—*M.R.*

1925–1927

7K–20 551.51

*Horiguti, Yosiki, **Life-history of the typhoon on the end of March, 1923.** *Kobe, Japan. perial Marine Observatory, Memoirs*, 2(1):9–24, March **1925.** 8 plates, 8 tables. **NNA**—Mete logical data during the earlier stage of the March 1923 typhoon from Japanese merchant sea

given and discussed with regards to theory of typhoons. *Subject Heading:* **1. Typhoon theory.** *P. Kramer.*

7K–21 551.515.23

Chu, Co-ching, **The place of origin and recurvature of typhoons.** *Monthly Weather Review*, –5, 1925. fig., 10 tables, 20 refs. **DWB**—Theoretical determination of region of formation and ce movements of typhoons from study of occurrences, 1904–1915. *Subject Heading:* **1. Recurva- of typhoons.**—*H. P. Kramer.*

7K–22 551.515.2(265)

Hennessy, J., **Typhoons of the North Pacific and China Seas.** *Kobe, Japan. Marine Ob- tory, Memoirs*, 2:124–127, Aug. 1925. fig., tables. **DWB**—Facts of practical use to seamen at typhoons are summarized, including regions and extent, frequency in W. Pacific by month, on of origin, speed and direction of movement, precursory signs of typhoons, etc. *Subject dings:* **1. Typhoons 2. North Pacific.**—*H. P. Kramer.*

7K–23 551.576:551.515.2(265)

Ishimaru, Yukiti, **Upper cloud observation during the passage of a typhoon.** *Meteorological iety of Japan, Journal, Ser. 2*, V. 2/3:221–226, 1925. 5 figs., 3 refs. In Japanese; English mary p. 27. **DWB, DLC**—Results of cloud movement observations during typhoon during y. 1924 in the Ryukyu Islands are discussed and illustrated in diagrams showing angles of deviation winds and clouds at different points during typhoon. *Subject Headings:* **1. Typhoon clouds yphoon, Ryukyu Islands (1924) 3. Ryukyu Islands.**—*H. P. Kramer.*

7K–24 551.515.2:912(267)

Normand, C. W. B., **Storm tracks in the Bay of Bengal.** Calcutta, India. Meteorological partment, 1925. 10 maps. **DWB**—Tracks of all severe storms in the period 1891–1923 in the y of Bengal and the Arabian Sea are plotted in 10 separate maps covering all months of the year. *ject Headings:* **1. Hurricane atlases 2. Hurricane tracks 3. Bay of Bengal 4. Arabian Sea.** *V.N.*

7K–25 551.515.23

*Chapel, L. T., **Winds and storms on the Isthmus of Panama.** *Monthly Weather Review*, 55(12): –530, Dec. 1927. 9 figs., 8 tables. **DWB**—Air movements and wind systems at the Isthmus, uding almost every variety of wind and storm of the Tropics, are discussed. Tabulated and phed data include 19 years of record from Colon (1908–1926) of air and water temperatures, d frequency and storms (such as Northers) and 30 hurricanes. Relation between southerly ds and genesis of hurricanes is demonstrated. *Subject Headings:* **1. Atmospheric disturbances Hurricane formation 3. Panama.**—*W.N.*

7K–26 551.515.2

Selga, M., **The height of typhoons.** *Pacific Science Congress, Tokyo, 1926, (Proceedings)*, 409–1418, pub. [1927(?)]. 28 refs. **DLC**—Various theories on height of tropical cyclones are ntioned and briefly analyzed. Some examples cited. *Subject Heading:* **1. Typhoon height.** *H. P. Kramer.*

1930–1934

7K–27 551.515.23(729.5)

*Fassig, Oliver L., **On the frequency of hurricanes in the vicinity of Puerto Rico.** *Monthly ather Review*, 58(8):326–327, Aug. 1930. 5 tables. **DLC**—Material, including a list of 44 ricanes during 1515–1899 and data from U. S. W. B. storm warning stations from 1898 to date, s analyzed. The results, presented in tables and briefly discussed, cover: 1) storm frequencies months, 2) distribution by centuries and 3) a list in which 20 hurricanes (1899–1926) are classified ording to wind force and area of action. Probably 1 severe, 6 moderately severe, and 12 harmless ricanes will appear in Puerto Rico in the next generation. *Subject Headings:* **1. Hurricane quencies 2. Puerto Rico.**—*W.N.*

7K–28 551.515.21

Roy, S. C. and Roy, A. K., **Structure and movement of cyclones in the Indian Seas.** *Beiträge Physik der freien Atmosphäre*, 26(3):224–234, 1930. 5 figs., 2 tables, 11 refs. **DLC**—The flected monsoon" current supplies the energy to the "active up-glide surface" which is the seat the energy in a cyclone. Magnitude of destructive forces is associated with the passage of the ive front, carried forward by the momentum of humid winds feeding into the cyclone. The calm

center of a cyclone suggests sudden cessation of two opposing air currents at the terminus of active front. *Subject Headings:* **1. Cyclone structure 2. Cyclone movement 3. Indian seas.**—*W*

7K–29 551.513.13:551.50

§Angervo, J. M., **Zur Theorie der Zyklonen- und Antizyklonenbahn.** [Contribution to theory of cyclone and anticyclone tracks.] *Beiträge zur Geophysik*, 33 (Köppen Band II):45– **1931.** 5 figs., 6 charts, 7 refs., eqs. **DLC**—The simplified iterative formulas presented here w derived from the author's earlier equations for numerical prediction of movement of cycl tracks, and were found to give good agreement with actual tracks over Scandinavia and Cen Europe during June 1931. This method might be adapted to numerical prediction of trop cyclone tracks. *Subject Headings:* **1. Cyclone track forecasting 2. Numerical forecasting.**—*W.*

7K–30 551.515.11(26

§*Mal, Sobhag and Desai, B. N., **A study of the structure of the Bay storm of November 19** *India. Meteorological Dept., Scientific Notes*, 4(39):87–100, 1931. 24 figs., 10 tables, foot-r **DLC**—Indirect evidence for J. Bjerknes and Solberg's theory that a "back-bent" occlusion ena a cyclone to increase its kinetic energy is demonstrated here. Even the occluded and apparer dying cyclone may be rejuvenated by the appearance of a strong secondary cold front. *Sub Headings:* **1. Cyclone structure 2. Bay of Bengal.**—*W.N.*

7K–31 551.515.2:551.577

Takaya, Shizuma, **Rain field of extra-tropical cyclone.** *Sea and Sky [Umi to Sora]*, Ko Japan, 11:151–168, **1931.** 11 figs., many tables, 7 refs. In Japanese. **DLC**—Making several c studies (typhoon of Oct. 25, 1929; cyclone of Nov. 5, 1927; cyclone of Oct. 2, 1926; cyclone of Jan. 1929), the author concludes that in the Far East a cyclone structure with warm and cold fronts reported by the Bergen school does not exist. This is true for the intensive typhoons invading middle latitudes, where these cyclones are completely free from frontal structure with wide r field. *Subject Heading:* **1. Typhoon rainfall.**—*H. Arakawa.*

7K–32 551.515.23(263

*§Tingley, Franklin G., **The genesis of a tropical cyclone.** *Monthly Weather Review*, 59(9):34 347, Sept. **1931.** 8 figs., 4 tables, 3 refs. **DLC**—This paper, discovered after the author's dea and partially revised by Willis E. Hurd, gives a detailed analysis based on all available sh land and upper air wind observations in the S.W. Caribbean and Isthmus of Panama area, of t initial stages of the Caribbean hurricane of Oct. 13–29, 1926 (described with respect to later sta and damage by Hurd on H. O. Pilot Chart, North Atlantic Ocean, for Oct. 1930). All pertine data for Oct. 13–20, and eight 12-hour synoptic charts for Oct. 14–17, are presented in support conclusions. In 44 years, 54 cyclones (23 of hurricane intensity) formed in this area. The evide indicates: 1) reduced pressure with weak circulation over an area 300 miles in diameter; 2) streng ening of southerly winds at Balboa, 250 mi from center; 3) increase in wind above the 300 m le at Coco Solo—all 3 before formation of a distinct cyclone; and 4) 3-day period of genesis bef hurricane winds occurred. South Pacific air may have been brought into region across Isthm during development period, to strengthen circulation. *Subject Headings:* **1. Hurricane gene 2. Hurricane, Caribbean (1926) 3. Caribbean Region.**—*M.R.*

7K–33 551.515.23

Claxton, T. F., **Isotyphs showing the prevalence of typhoons in different regions of the Far Ea for each month of the year.** Hong Kong, **1932.** 2 p.+12 charts. **NNA**—Work consists entir of monthly charts of the region from about 4° to 48°N, with brief explanatory comments for ea month. Results are derived from study of all known typhoons, 1884–1930. *Subject Headin* **1. Typhoon frequencies 2. Far East.**—*H. P. Kramer.*

7K–34 551.515.23(729):551.

McDonald, W. F., **Low barometer readings in West Indian disturbances of 1932 and 193** *Monthly Weather Review*, 61(9):273 274, Sept. **1933.** table. **DLC**—Pressures of 28.50 in. or lower tropical disturbances characterize storms of severe hurricane intensity. Tabulated barome readings from ship observations in West Indian hurricanes of July, Aug. and Sept. 1933 show readings below 28 in., stemming from 4 separate storms. The readings, ranging from 28.50 down 27.40, include date, name of vessel and her position. The problem whether tropical disturban arise as intense vortices of small diameter that expand in area and decrease in intensity as th progress is discussed briefly. *Subject Headings:* **1. Barometric minima 2. Hurricane formati 3. West Indies.**—*W.N.*

7K–35 551.515.23

Chapel, L. T., **The significance of air movements across the equator in relation to the develop-nt and early movement of tropical cyclones.** *Monthly Weather Review*, 62(12):433–438, Dec. **4.** 5 refs., 5 tables. **DLC**—It is shown that a definite relationship exists, but the exact function l the relative importance of the air movements cannot be defined. Analysis of tabulated wind l pressure data, including 45 storms during 1908–1933, suggests unusual combinations of simple ther processes and atmospheric action which control the formation of tropical cyclones, rather n one simple process. *Subject Headings:* **1. Tropical cyclone formation 2. Air flow across ator.**—*W.N.*

7K–36 551.553.21 551.515.1 551.515.2(51)

§Fochler-Hauke, Gustav, **Monsune, Depressionen und Taifune Südchinas.** [Monsoons, ressions and typhoons of South China.] *Beiträge zur Geophysik*, 43:233–244, **1934.** 3 figs., refs. English summary. **DLC**—These three major factors in the climate of South China are h discussed. First the major factor, the monsoons, caused by the Siberian anticyclone in winter l the continental low in summer, are taken up. Next extratropical continental cyclones, conditions their occurrence, development, tracks, etc., and lastly the typhoons of summer, their physical ributes, forecasting problems, etc. are discussed. (*Same item as* 5B–132, Feb. 1954, *MAB.*) *bject Headings:* **1. Monsoons 2. Depressions 3. Typhoons 4. South China.**—*H. P. Kramer, Martinoff.*

7K–37 551.515.2(52):551.543.6

Okada, T., **Lowest pressure in a tropical cyclone.** *Meteorological Magazine*, 69(826):237, v. **1934. DLC**—The reading of a Fortin type mercurial barometer at Muroto Meteorological ation (Osaka, Japan) 31°15′N, 134°11′E, 186 m.a.s. during the passage of the typhoon of Sept. 21, 34 was 684.0 mm or 911.9 mb. This may be the lowest station reading, but 665.2 mm or 886.8 o was read aboard the Dutch ship S.S. "Sapaeraea," Aug. 18, 1927 in the Pacific 460 mi east of zon (Philippines). *Subject Headings:* **1. Barometric minima 2. Muroto Typhoon (1934) 3. Japan.** *W.N.*

7K–38 551.515.2:551.509.318(691)

Poisson, Charles, **Sur la formation de typhons à Madagascar.** [The formation of typhoons in adagascar.] *Madagascar. Service Météorologique, Publication*, No. [2, **1934**]. 8 p. **DWB**—he formation of typhoons is interpreted as a result of a collision between a monsoon and a cold lar air mass. The study of small typhoons based on the Madagascar Meteorological Service orm Warning System's recently intensified reports is declared to confirm this theory which has en successfully applied to forecasts. Author stresses necessity of comparing his results with formation obtained from other typhoon areas if general conclusions are to be reached. *Subject eadings:* **1. Typhoon formation 2. Typhoon forecasting 3. Madagascar storm warning service Madagascar.**—*G.T.*

1935

7K–39 551.515.23

§Byers, Horace R., **On the meteorological history of the hurricane of November 1935.** *Monthly eather Review*, 63(11):318–322, Nov. **1935.** 3 charts. **DWB**—This analytical study of the storm nich developed about 300 mi east of Bermuda appears to confirm the hypothesis of cyclogenesis sulting from (1) large-scale convection and (2) converging winds. Presence of moist, unstable r caused convection. The synoptic situation is clearly indicated in the three accompanying charts. *ubject Headings:* **1. Synoptic studies 2. Hurricane genesis.**—*W.N.*

7K–40 551.515.21

Haurwitz, Bernhard, **The height of tropical cyclones and of the "eye" of the storm.** *Monthly eather Review*, 63(2):45–49, Feb. **1935.** 2 figs., 3 tables, 13 refs., 4 eqs. **DWB**—Arguments gainst theory that tropical cyclones are phenomena restricted to the lowest layer of the atmosphere e given, including observational evidence from some typhoons. Equations are developed for termining heights of typhoons. *Subject Headings:* **1. Tropical cyclone theory 2. Typhoon eight.**—*H. P. Kramer.*

7K–41 551.509.33:551.515.23(729.5)

Ray, Clifton L., **Relation of tropical cyclone frequency to summer pressures and ocean surface-ater temperatures.** *Monthly Weather Review*, 63:10–12, Jan. **1935.** 4 tables. **DWB**—Spring and ummer pressures at San Juan, Puerto Rico and ocean temperatures are inversely related to tropical orm frequencies in Caribbean in summer and autumn. Trade winds of winter have a correlation +.53 with pressure over North Atlantic 16 months later. (*Same item as* 2B–133, Feb. 1951,

M.A.B.) Subject Headings: 1. Hurricane frequencies 2. Hurricane forecasting 3. Correlat
4. San Juan, Puerto Rico.—*C.E.P.B.*

7K–42 551.515.23:551.5

Tannehill, Ivan Ray. **A relation between temperature and cyclone frequency in the tro**
American Geophysical Union. Transactions. Part I:121–124. Aug. 1935. 5 figs., 5 refs. DL
The annual variation in monthly mean temperatures in the tropical Pacific, mean monthly ra
and temperature in British Guinea, and monthly mean temperature in Cape Verde region
presented graphically vs. monthly frequency of tropical cyclones in various parts of the world (
1923). It is concluded that a double period in the annual variation of insolation in equatorial reg
is accompanied by a double variation in temperature which may be responsible for the two max
of cyclone frequency in some tropical regions. *Subject Headings:* 1. Tropical cyclone frequen
2. Temperature-tropical cyclone relationships.—*W.N.*

1936

7K–43 551.515:551

Arakawa, H.. **Theory of convection thundershowers, convection cyclones and anticyclo**
Geophysical Magazine. Tokyo. 10:1:43–60. 1936. 11 figs., tables, refs., numerous eqs. DW
Fundamental principles of convection and hydrodynamical theory of air on the rotating globe
used as basis for theoretical considerations of characteristics of secondary circulations. *Same*
as H–50. Aug. 1950. *M.A.B. Subject Headings:* 1. Thunderstorm dynamics 2. Convection 3.
clones.—*H. P. Kramer.*

7K–44 551.51

Haurwitz, B., **On the structure of tropical cyclones.** *Royal Meteorological Society, Quart*
Journal. 62:263:145–146. Jan. 1936. eqs. DLC—Author's formula for the height of bound
between two air masses was derived from the hydrostatic equation. In this brief discussion
demonstrated how the very same formula can be derived differently, viz. by means of the
pression of the inclination of a surface of discontinuity. Applied to the Manila cyclone of Oct.
1882, the funnel shape of the eye of that hurricane was determined. *Subject Headings:* 1. Trop
cyclone structure 2. Eye of hurricane.—*W.N.*

7K–45 551.515.2:551.

Haurwitz, B., **On the vertical wind distribution in anticyclones, extratropical and trop**
cyclones under the influence of eddy velocity. *Beiträge zur Geophysik.* 47:1/2:208–214. 1
2 tables, fig., foot-refs. German and English summaries p. 208. A short version in *Amer*
Meteorological Society, Bulletin. 17:10:292–295. Oct. 1936. DLC—The author has shown i
previous paper that in cyclones the gradient wind level is lower than in anticyclones since in
former the centrifugal force counteracts the effect of friction while it acts in the same direction
anticyclones. It follows from this theoretical study that in cyclones the angle between press
gradient and surface wind decreases with increasing distance from the center and increases in a
cyclones, as is borne out by observations. In tropical cyclones this effect is rather important s
the wind component towards the center must decrease very rapidly with the elevation in the cen
region. This offers a partial explanation for the eye of intensive tropical storms. The computa
of the angle between pressure gradient and surface wind by means of an approximation form
gives good agreement with the values measured in various distances from the center in an actual
Subject Headings: 1. Wind distribution in tropical cyclones 2. Hurricane structure 3. Ey
hurricane.—*Author's abstract.*

1937

7K–46 551.515.21:515.3

§Arakawa, H., **The vertical structure of typhoons.** *Beiträge zur Physik der freien Atmosph*
24:156–161, 1937. 7 figs., refs. **NN.** Also in *Meteorological Society of Japan, Journal.* V.
Aug. [1936]. In Japanese. Summary in English in *American Meteorological Society, Bull*
17:313, 1936. DLC—Discusses conditions in S. E. and N quadrants of typhoons with some u
air data diagrams kept at Tateno, Aug. 1931 and synoptic charts as well as fronts and two type
typhoon tracks. *Subject Heading:* 1. Typhoon structure.—*H. P. Kramer.*

7K–47 551.51

Deppermann, Charles E., **Temperature conditions in the eye of some typhoons.** Ma
1937. 19 p. 11 tables, 23 refs. **NNA, DWB**—After discussing evidence from several typh
with regard to the conditions in the calm eye of a typhoon, the author returns to ALGUÉ's ori

...ion that there is no real evidence in favor of descending air in that region and puts off any ...ther conclusion for further investigation. *Subject Heading* 1. Eye of typhoon.—*H. P. Kramer.*

7K–48 551.515.23(662)

Rodewald, Martin. **Das Grüne Kap Westafrikas als Stätte einer quasistationaren Strömungs-...klarität.** "Cape Verde, West Africa as the location of a quasi-stationary air current singularity." ...ten der Hydrographie und Maritimen Meteorologie 65 206–211. 1937. DLC—Cape Verde is ...ward as the locus of the convergence of three currents—the harmattan trade and monsoon ...ers show the wind systems and weather conditions at different times of year. The association ...e West African "variations" and tropical cyclones of the ocean and the wind system is discussed. ...e item in 7K–106 Aug 1952 MWR. *Subject Headings* 1. Tropical cyclone formation 2. Cape ...rde, French West Africa.—*H. P. Kramer.*

1938

7K–49 551.515.23:551.558

Durst, C. S. and Sutcliffe, R. C. **The importance of vertical motion in the development of ...ical revolving storms.** *Royal Meteorological Society, Quarterly Journal* 64 75–94. 1938. fig., ... 5 refs. 6 eqs. DWB—By examination of equations of motion, the problem of mechanism ...e ascension of air from tropical revolving storms might be explained by the upflow of air from ...s of greater velocity to those of less velocity. A proposition which may have important ...lications to many other problems is enumerated. *Subject Headings* 1. Tropical cyclone forma-...2. Vertical motion.—*H. P. Kramer.*

7K–50 551.515.23(729)

Entermann, H. **Zur Entstehung Westindischer Orkane.** "On the origin of West Indian ...canes." *Meteorologische Zeitschrift* 55 9 317–320. Sept. 1938. 6 figs, table, 8 refs. DLC—...e factors responsible for the birth of a West Indian hurricane are mainly: 1) the advancement of ...extratropical cold air and of m-t-equatorial warm air from the monsoon regions toward the ...h; liability of the atmosphere and 2) regular release of conditional instability, which are mani-...ed by an increased western high pressure cell, partial destruction of the equatorial pressure region ...d formation of a cyclone at a cold front moving slowly in a southward direction. *Subject ...dings* 1. Hurricane formation 2. West Indian hurricanes.—Trans. of author's abstract.

7K–51 551.515.21

Gherzi, E. **On the constitution of typhoons.** *American Meteorological Society, Bulletin.* 19 2 ...96. Feb 1938. fig. 1 refs. DWB. Also: Rodewald, Martin. **On tropical vs. extratropical ...onic structure.** Comments on Gherzi's "Constitution of typhoons". *Ibid.* 19 8 339–341. ... 1938. And: Deppermann, C. E. Some comments . . . *Ibid* 19 369–375. Nov 1938. 2 figs. ... And: Gherzi, E. "Reply to Deppermann and Rodewald". *Ibid.* 20 6 265–267. June 1939. ...B—The questions of frontology in analysis of typhoons and origin of typhoons are discussed from ...posing points of view of these authors. *Subject Heading* 1. Typhoon structure.—*M.L.P.*

7K–52 551.515.21

Gherzi, E. **Remarks on some new researches on the nature of the "tropical cyclone."** *Beitrage Geophysik* 53 316–322. 1938. refs. DLC—Theoretical discussion of origin and nature of ...ical cyclones presenting critical analysis and further arguments for his own theories as opposed ...those of M. Rodewald. *Subject Heading* 1. Tropical cyclone theory.—*H. P. Kramer.*

1939

7K–53 551.515.2(265)

Gherzi, E. **Typhoons in 1926 . . . 1938.** [Shanghai] 1927–1939. tables. DLC, NNA—...ual report of typhoons and semi-periodical depressions by months giving descriptive accounts of ...tion, progress, conditions, etc. for each. Additional studies are included on various features of ...hoons in general as follows: "Where do the typhoons develop?" (1937). Distribution of clouds in a ...hoon (1936); Some data about typhoon centres (1931). Note on the swell of cyclones (1931); ...hoons and "fronts" (1936); Set caused by tropical cyclones (1934). The "pumping" of typhoons ...s. The hurricane wave (1937); The steering of typhoons (1938). See 2K–42–44 Sept 1958. ...B. *Subject Headings* 1. Typhoons 2. Western Pacific.—*H. P. Kramer.*

7K–54 551.515.23(265)

Harmantas, L. ... **Extracts from notes derived from synoptic maps and flights in the Manila-...m sector.** *American Meteorological Society, Bulletin,* 29 7 301–303. Sept. 1939. DWB—...nditions for typhoon development concluded from 3 years synoptic analysis supplemented with

weather reports from planes and temperature soundings, are listed and discussed: 1) converg over a large area; 2) large scale vertical convections with such an area; 3) horizontal converg aloft. *Subject Headings:* **1. Typhoon formation 2. Synoptic studies 3. Western Pacific.**—*H Kramer.*

7K–55 551.51

Tu, Chang-wang, **A note on the constitution of typhoons.** *American Meteorological Soc Bulletin*, 20(3):117–119, March **1939.** fig., 9 refs. **DLC**—Upper air front formation between and Tm air masses in China suggests similar conditions where typhoons are born. This contrad GHERZI's statements that typhoons originate in homogenous trade air and with no relation with fronts. BJERKNES and BERGERON's theories on cyclonic formation are supported by the relation found between typhoon formation and Australian cold wave outbreak. *Subject Heading:* **1. Typh genesis.**—*W.N.*

1940

7K–56 551.51

Arakawa, H., **The formation of hurricanes in the South Pacific and the outbreaks of cold from the North Polar Regions.** *Meteorological Society of Japan, Journal. Ser. 2*, 18(1):1–7, **1940.** 12 figs., 7 refs. In Japanese; English summary p. (35). **DLC**—Author shows that a mar outbreak of cold air from the north polar region which moved southward and surged against equatorial front in the Southern Hemisphere is an outstanding feature of the formation of hurrica in the South Pacific. This conclusion agrees with S. Li (*Berlin Meteorological Institute, Ver* Bd. 1, Heft 5) who shows that formation of typhoons in the North Pacific is related to outbrea cold waves in Australia. *Subject Heading:* **1. Hurricane formation.**—*Author's abstract.*

7K–57 551.515.2:551.52

Nishina, Y.; Arakawa, H. et al., **Cosmic-ray intensities and typhoons (Cosmic rays as a poss meteorological factor, Pt. 4).** *Meteorological Society of Japan, Journal, 2nd Ser.*, 18:258–261, **1940.** 6 figs. In Japanese; English summary p. (28)–(29). **DLC**—Brief summary made of stud cosmic ray intensities in different quadrants of a typhoon with illustrative diagrams. In typh of Sept. 11, 1937, Sea of Japan, cosmic-ray variations are found to be in accord with aerolog observations and are attributed to temperature effects. *Subject Headings:* **1. Typhoons 2. Cos ray influences.**—*H. P. Kramer.*

1942

7K–58 551.51

†Cline, Isaac Monroe, **A century of progress in the study of cyclones. Aids in forecasting mo ments and destructive agencies in tropical cyclones.** 3rd ed. New Orleans, La., Rogers Print Co., **1942.** 47 p. 3 figs., 96 refs. **DLC**—This presidential address, read before the Ameri Meteorological Society's Pittsburgh Meeting, Dec. 1934, is a review of the world-wide work on masses and winds, the characteristics of which are responsible for hurricane genesis. Forecast is discussed briefly. Finally, the history of the disastrous Galveston hurricane, Sept. 8, 1900 given. At that time forecasts needed central office (Washington, D. C.) authorization, howe author's unauthorized warnings based on tides rather than pressure and winds reduced the he toll of lives. *Subject Headings:* **1. Hurricane genesis 2. Hurricane forecasting 3. Hurrica Galveston (1900).**—*W.N.*

7K–59 551.51

Heywood, G. S. P., **Some features of a typhoon.** *American Meteorological Society. Bulle* 23(2):47–52, Feb. **1942.** 2 figs., 8 refs. **DWB**—Detailed analysis of typhoon as observed at H Kong, Nov. 1939, especially as regards to association with frontal conditions (opposing GHER theories). *Subject Headings:* **1. Hurricane fronts 2. Typhoon, Hong Kong (1939) 3. Hong Ko** —*H. P. Kramer.*

7K–60 551.515

McDonald, W. F., **On a hypothesis regarding development and decay of tropical hurrica** *American Meteorological Society, Bulletin*, 23(2,3): 73–78; 117–121, Feb., March **1942.** 11 **DWB**—Hurricanes go through four phases, each of which is discussed in relation to the struct and dynamic factors operating to develop or destroy the vortex. First is the genetic, second deepening, third the expanding and fourth the declining phase. The genesis may occur in any or more of four ways: 1) through advection of unstable air, 2) release of conditional instabi (by heating), 3) release of heat from rainfall, and 4) localization of vortical influences. The vo can become only so deep (about 4″ below normal pressure) because of limiting factors in the vironment; the vortex always expands but pressure does not deepen. Hence the gradient weak

this stage. *Subject Headings:* **1. Hurricane formation 2. Hurricane development 3. Hurricane ory.**—*M.R.*

7K–61 551.515.23

Millás Hernandez, José Carlos, **On the genesis of hurricanes of the Western Caribbean Sea.** *n American Scientific Congress, Washington, D. C., May 1940, Proceedings (of the 8th American entific Congress)*, Vol. 7:291–296, pub. **1942. DLC**—The expression "hurricane embryology," coined by the author, encompasses: 1) previous state of the atmosphere; 2) state directly previous the inception of the hurricane germs; 3) germ period of the hurricane; and 4) period of the de- opment of the hurricane. Brief comments are given under these headings at the end of the cussion. *Subject Heading:* **1. Hurricane formation.**—*W.N.*

7K–62 551.515.23(267.4)

Sen, S. N., **Mechanism of cyclones in the Bay of Bengal.** *American Meteorological Society, lletin*, 23(2):68–72, Feb. **1942.** fig., table, 3 refs. Also in: *Science and Culture*, Calcutta, 3:458–1, **1938. DLC**—Tabulated data on percent frequency of cyclones 1891–1935, are given for each nth. Graphical example of deformation fields as a function of strong convergence is given to monstrate origin. The possible forecasting of hurricanes is discussed. Cold, moist and warm air usses as the substance of hurricanes are discussed, along with mechanism of movement and other tors. *Subject Headings:* **1. Hurricane frequencies 2. Bay of Bengal cyclones.**—*W.N.*

1945

7K–63 551.515.21

Deppermann, Charles E., **Some aspects of equatorial weather and of the typhoon problem.** *nerican Geophysical Union, Transactions*, 26:213–216, **1945. DLC**—Brief summary of the most portant conclusions of several papers by DEPPERMANN, which were lost in the war, are given. he on upper air characteristics was based on temperature, pressure and humidity aloft data from teorograph records at Hong Kong, Singapore, Batavia and Manila. Other papers dealt with: nd roses for the Philippines up to 15 km (based on pilot balloon observations for 5 Philippine ations); upper air circulation around typhoons giving average circulation up to 500 mi from center, large and small typhoons of three types; energetics of typhoons (which attempted to show im- rtance in tropics of certain terms in equations of motion not so important in temperate zones) d the importance for typhoon formation and deepening of the disappearance of pressure exerted water vapor when it condenses into heavy rainfall, if the strong rotation motion prevents its placement by other air); barometric fine structure at Manila (study of small oscillations or devia- ons in pressure found on tenfold magnified Fuess barograph-curves); origin of typhoons in the arianas and Carolines; gusty southeast wind at Manila which explained origin of this wind with les for prediction; the question, should virtual temperatures be used in the tropics (showing that using virtual temperatures on adiabatic charts instead of the usual dry-bulb temperatures, one ay possibly get a fairer idea of conditions of stability, especially in neighborhood of inversions); lative humidity gradient and cloud bases; and distribution frequency of thunderstorms in the ilippines. *Subject Headings:* **1. Typhoon dynamics 2. Tropical meteorology 3. Pacific area.**—*P. Kramer.*

7K–64 551.515.2

Panofsky, H. A., **The slope of axes of pressure systems.** *American Meteorological Society, ulletin*, 26(4):101–103, April **1945. DLC**—A theoretical model of tilt of high level pressure systems er ocean. *Subject Headings:* **1. Hurricane models 2. Hurricane tilt.**—*M.R.*

1946

7K–65 551.515.8(266)

*Alpert, Leo, **The inter-tropical convergence zone of the eastern Pacific Ocean, Pt. 1.** *American eteorological Society, Bulletin*, 26(10):426–432, Dec. **1945.** Pt. 2. *Ibid.*, 27(1):15–29, Jan. **1946.** . 3. *Ibid.*, 27(2):62–66, Feb. **1946.** figs., tables, refs. **DLC**—ICZ data as obtained from Feb. 942–Jan. 1944 are analyzed and discussed. Mean monthly ICZ latitudinal position and movement tween 90°W and 95°W long. are tabulated along with wind data including direction, frequency, c. The aircraft observations of winds are grouped from sea level up to 2,000 ft, 4,000 ft and 000 ft. The unit areas were 1° lat. by 6° long. (*See* U. S. W. B., **Hurricane Notes.** Its *Training aper*, No. 1, **1948.** p. 205.) *Subject Headings:* **1. Inter-tropical convergence zone observations Inter-tropical convergence zone data analysis 3. Eastern Pacific.**—*W.N.*

7K–66 551.515.21:551.511

Deppermann, Charles E., **Is there a ring of violent upward convection in hurricanes and ty- hoons?** *American Meteorological Society, Bulletin*, 27:6–8, **1946.** fig., eq. **DWB**—Evidence that

there is a narrow ring of violent upward convection in the hurricane and the typhoon and theoret calculations involved in its analysis are presented. *Subject Headings:* **1. Hurricane dynan 2. Convection in hurricanes.**—*W.N.*

7K–67 551.515.2(265):551.50

Kidd, Kenneth and Reed, Charles K., **A study of several typhoons in the West Pacific, 1 Pt. 1–2.** *American Meteorological Society, Bulletin*, 27:232–242, 288–305, **1946.** 15 figs., 3 tab 10 refs. **DWB**—Brief study of some of the typhoons affecting military operations in S.W. Pa in 1945 are presented, with emphasis on their origin and movement, accompanied by selected analy daily surface charts. Second part of paper (p. 288–305) presents a composite picture of the sto and typhoons that occurred in the Pacific west of 160°E and north of equator April–Dec. 1945 discusses briefly their general characteristics of formation, development and movement, and pres tentative rules for forecasting typhoon movement developed while authors served as typhoon offi in U. S. Army Air Forces, Manila. *Subject Headings:* **1. Typhoons, Western Pacific (1945) 2. phoon forecasting 3. Western Pacific.**—*H. P. Kramer.*

7K–68 551.509.52:551.51

§Krasner, William, and London, Julius, **A method of forecasting development of tropical cyclon** With comments by H. T. Magill. *American Meteorological Society, Bulletin*, 27:377–383, 19 13 figs., 12 refs. **DWB**—A method is devised (based on theory of BJERKNES and HOLMBOE deepening of cyclones) for the forecasting of the deepening of cyclones. Concluded that eastw tilt of pressure or streamline axis of trough or developing tropical disturbance is most favorable deepening; whereas in deep easterlies, a westward tilt of the axis would result in filling and sipation. *Subject Headings:* **1. Tropical cyclone forecasting 2. Magill, H. T.**—*From auth abstract.*

1947

7K–69 551.509.

Australia. Meteorological Branch, **A series of Australian synoptic situations.** *Austra Meteorological Branch, Monthly Note*, AMFA M. 68, [**1947**]. Also: *U. S. Office of Naval Operatio NAVAER* 50-IR-205. 12 p. 31 figs. **DWB**—Synoptic situations in Australia, Jan. 1947, described and illustrated on small charts for the following conditions: intense hailstorm at Sydn tropical storm off N.E. Australia, complicated situation off Cape Leeuwin, anticyclone over N Zealand and its influence on east Australian weather. (*Same item as* 4D–167, April 1953, *MA Subject Headings:* **1. Synoptic studies 2. Tropical cyclones 3. Anticyclones 4. Australia 5. N Zealand.**—*H. P. Kramer.*

7K–70 551.515

Colón, José A., **Influence of the magnus effect on the motion of tropical cyclones.** *Ameri Meteorological Society, Bulletin*, 28:248–249, **1947. DLC**—After study was made incidental t research project on tropical hurricanes, author reaches no definite conclusions but believes that magnus effect on the movement of hurricanes if it exists, is really very small. *Subject Headi* **1. Hurricane movement.**—*H. P. Kramer.*

7K–71 551.515

Deppermann, Charles E., **Notes on the origin and structure of Philippine typhoons.** *Ameri Meteorological Society, Bulletin*, 28:399–404, **1947.** fig., 2 tables, 5 eqs. **DWB**—The main eleme of the author's ideas on typhoon origin and structure are outlined and subjected to approxim mathematical treatment, giving satisfactory magnitudes for pressure gradients and proper shape pressure curves. Most essential elements of typhoon origin and structure are discussed. *Subj Headings:* **1. Typhoon formation 2. Typhoon structure.**—*H. P. Kramer.*

7K–72 551.515.23:551.515.711(263

Klein, William H. and Winston, Jay S., **The path of the Atlantic hurricane of Septem 1947 in relation to the hemispheric circulation.** *American Meteorological Society, Bulletin*, 28(1 447–452, Dec. **1947.** 5 figs., 13 refs. **DLC**—The movement of the Atlantic hurricane of Se 11–20, 1947, into the Gulf of Mexico rather than up the Atlantic Coast, is attributed to dynar anticyclogenesis over the eastern United States. An attempt is made to explain this anticy genesis by the transfer of energy downstream from the mid-Pacific at a rate considerably grea than the speed of individual air particles. The motion and change in intensity at 700 mb trou and ridge systems are discussed in terms of constant absolute vorticity, horizontal temperat advection, and the process of confluence. It is concluded that the large-scale features of hemispheric circulation are of great importance for short-range, as well as for extended weat

ecasting. *Subject Headings:* **1. Anticyclogenesis 2. Hurricane movement 3. Hurricane, Gulf of exico (1947) 4. Gulf of Mexico.**—*Authors' abstract.*

1948

7K–73 551.515.2:551.521.13(729)

Abbot, Charles Greeley, **Solar variation attending West Indian hurricanes.** *Smithsonian Miscellaneous Collections*, 110(1), April 20, **1948.** 7 p. fig., 3 tables, 13 refs. **DLC**—Values of solar constant were tabulated from 10 days before to 12 days after dates when 63 hurricanes were first reported. Full table given. The averages show a gradual decrease in first 10 days and then a sharp minimum on actual day, recovering on third following day. (*Same item as* 2.4–78, April 1951, *MAB.*) *Subject Headings:* **1. Hurricanes 2. Solar constant variations 3. West Indies.** —*C.E.P.B.*

7K–74 551.515.21:551.515.21:551.515.13

*†Defant, F., **Theorie der Steuerung und Spaltung von Bodendruckstörungen durch quasi-stationäre Hohendruckverteilungen.** [Theory of steering and partition of ground-level disturbances by quasi-stationary high level pressure distributions.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 1(2):149–232, **1948.** 28 figs., 12 tables, 18 refs., numerous eqs. German, English and French summaries p. 149–150. **DWB**—On the basis of earlier investigations into primary and secondary pressure waves, a theory of steering of surface disturbances is constructed; five types of situations are analyzed. When upper pressure wave moves W–E more rapidly than surface wave no steering exists. With a quasi-stationary stratosphere system of large highs and lows and fast moving surface pressure waves a solution was evaluated for twenty days; surface disturbances undergo true steering. Steering clockwise with upper anticyclone, anticlockwise with upper cyclone, furthest S and weakest directly under upper low. N–S range of track proportional to amplitude of upper pressure wave but depends also on relation of periods of upper and lower waves. Partition is discussed by isallobars; this leads to a partial differential which gives exact time of partition. Theory agrees with observation. Finally, surface pressure changes in whole region of a surface disturbance are calculated in three terms: stratospheric, mean temperature in troposphere, pressure effect of surface circulation; results agree with observations. Paper ends with eight rules for application to forecasting. (*Same item as* 4–63, April 1950, *MAB.*) *Subject Headings:* **1. Steering 2. Atmospheric circulation 3. Cyclonic disturbances 4. Waves in the westerlies.** —*C.E.P.B.*

7K–75 551.509.2:551.515.2:551.576.11

Deppermann, Charles Edward, **Cirrus "stripes" and typhoons.** *American Meteorological Society, Bulletin*, 29:166–174, April **1948.** fig., 4 photos, 3 tables. **DWB**—Critical analysis is made of all cases of striped cirrus at Manila for one year, March 1946–1947. Causes of striped cirrus are noted and it is concluded that they are of typhoon forecasting value only if the depression is to Manila's E–SE and moving W–WNW; therefore great prudence should attend their use in forecasting. *Subject Headings:* **1. Typhoon forecasting 2. Forecasting from striped cirrus.**—*H. P. Kramer.*

7K–76 551.515.2:551.576.11

Frolow, S., **Observations d'un cyclone tropical en formation.** [Observations of a tropical cyclone in formation.] *La Météorologie*, 4th Ser., No. 9:66–71, Jan./March **1948.** 4 figs., photos. **DWB**—A study of the hurricane of mid-Sept. 1945, which crossed the Antilles to Florida, by means of the successive cloud formations. These are illustrated by a series of panoramic photos from Fort de France, showing convergence of cloud lines at a point 350 km to the north. (*Same item as* 3.4–130, April 1952, *MAB.*) *Subject Heading:* **1. Hurricane clouds.**—*C.E.P.B.*

7K–77 551.515.23

Simpson, R. H., **On the slope of low-pressure axes as a criterion for deepening in the tropics.** *American Meteorological Society, Bulletin*, 29:9–15, **1948.** 6 figs., 7 refs. **DWB**—Relation between slope of tropical low pressure axes and tendency for such lows to deepen or fill has been studied in Atlantic and Pacific Ocean areas. Preliminary conclusions are reviewed; limitations discussed; questions raised. Illustrations are given of fallacies of reasoning that may result from such an assumption in connection with tropical cyclones. *Subject Heading:* **1. Tropical cyclone formation.**—*H. P. Kramer.*

1949

7K–78 551.515.2:551.577.32

Flohn, Hermann, **Klimatologische Homologien. (Tropische Orkane und Zyklonentätigkeit in der Westdriftzone.)** [Climatological homologies: activity of tropical hurricanes and cyclones in

the zone of westerlies.] *Meteorologische Rundschau*, 2(7/8):198–202, July/Aug. **1949.** fig., 3 tab 22 refs. German and English summaries p. 198. **DWB**—Discusses similarity in seasonal distri tion of tropical cyclones in different oceans (and absence in S. Atlantic). The autumn maxim frequency increases cyclonic activity in temperate frontal zone and this explains autumn maxim of precipitation in N. W. Europe and N. W. America. (*Same item as* 4–64, April 1950, *MA Subject Headings:* **1. Tropical cyclones 2. Cyclonic disturbances 3. Precipitation variati 4. Europe 5. North America.**—*C.E.P.B.*

7K–79 551.515

James, R. W., **The structure of symmetrical depressions.** *Royal Society of New Zeala Transactions*, 77(5):71–76, Nov. **1949.** 2 tables, 17 eqs. **DLC**—While frontal analysis is hig successful for short term forecasts, the general long term situation is largely governed by symmetri systems. Author investigates geostrophic vortices on the observed basis that $h/(V_m R_m)$ va little (h=depth of depression, V_m is max wind speed at distance R_m from center). Two types profile are examined, exponential and power; the latter in the form $p=p_o+h/(1+r^n/a^n)$ fits observations of 18 cyclones with $n=2$ or 3. The synoptic implications are discussed, includin "barrier" effect which inhibits the overclose approach of two vortices. (*Same item as* 2.7– July, 1951, *MAB.*) *Subject Headings:* **1. Cyclone structure 2. Weather forecasting.**—*C.E.P.B.*

1950

7K–80 551.515

Arakawa, Hidetoshi, **Existence of descending motion in typhoon area.** *Meteorological Soci of Japan, Journal, 2nd Ser.*, 28(7):233–235, July **1950.** fig., table. In Japanese; English summa p. 235. **DWB**—There is marked descent of air 100–200 km in the rear of a typhoon center, o "föhn" type, different from that in the eye. It is explained as an isallobaric divergent mot due to the isallobaric high in the rear of the typhoon (illustrated by diagram of stream lines). Aut thinks it may occur also in some extratropical cyclones. (*Same item as* 2.7–84, July 1951, *MA Subject Headings:* **1. Tropical cyclones 2. Subsidence.**—*C.E.P.B.*

7K–81 551.515.1:551.577

Arakawa, H., **Path of cyclones and orographic rainfall.** *Meteorological Society of Japan, Journ 2nd Ser.*, 28(2):62–66, Feb. **1950.** 2 figs., eqs. In Japanese; English summary p. 66. **DWB** The intensity of rainfall in a straight mountainous archipelago is calculated from the quantity air ascending the barrier for a depression advancing along the archipelago and for one crossing it right angles. (*Same item as* 2.5–75, May 1952, *MAB.*) *Subject Headings:* **1. Cyclones 2. Precipit tion 3. Topographic effects 4. Orographic rainfall.**—*C.E.P.B.*

7K–82 551.515.227:551.501.7(5

Arakawa, H., **Vertical structure of a mature typhoon.** *Monthly Weather Review*, 78(11):197–20 Nov. **1950.** 3 figs., 5 tables, 8 refs. **DWB**—An aerological study of typhoon "Kitty" (Aug. 2 Sept. 1, 1949) which was the most destructive to strike the Tokyo area in years. The storm cent crossed the Island near Tokyo where a dense network of meteorological stations was operatin Radiosonde and wind aloft observations, including special releases, were obtained at Tokyo a Tateno during the typhoon. Thus a complete picture of the structure of a mature typhoon cou be presented. Detailed data as well as charts and theory are included in this brief but excelle paper. (*Same item as* 2.6–57, June 1951, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Upp air observation 3. Typhoon "Kitty" (1949) 4. Japan.**—*M.R.*

7K–83 551.515.2:551.513.3(5

Chakravortty, K. C., **Characteristics of calm centres of some cyclonic storms which formed the Bay of Bengal and passed over Calcutta and Saugor Island.** *Indian Journal of Meteorology a Geophysics*, 1(3):252–256, July **1950.** 5 figs., table, 3 refs. **DLC**—The author describes the win pressure, temperature, humidity, cloudiness and precipitation characterizing cyclonic storms passi over Alipore (Calcutta) and Saugor Island from Jan. 1934 to Aug. 1941. The present study i dicates that even on reaching the mainland, and after considerable weakening, some of the storn manifested the characteristics of calm centers observed in tropical cyclones. (*Same item as* 2.4–7 April 1951, *MAB.*) *Subject Headings:* **1. Cyclone structure 2. Hurricanes 3. India.**—*I.L.D.*

7K–84 551.515.21:551.578.12(5

Kasahara, Akira, **On the distribution of the amount of rainfall and filling-up of the "Kitt Typhoon."** *Tokyo. Univ. Geophysical Institute, Geophysical Notes*, 3(30), **1950.** 6 p. 7 fig table, 3 refs., 3 eqs. **DLC.** Also in: *Collected Meteorological Papers*, Tokyo, 2(2), Dec. **1950.** English. **MH-BH**—The distribution of rainfall in the Japanese typhoon of Aug. 27–Sept. 1, 19

alculated by SYONO's expression for vortical rain (*see* 7K–109). Time-distance sections of the hoon at 4 places show wind speed and calculated and observed rainfall, the latter in fair agreement. rate of filling up was about 10 mb hr, this is only $\frac{1}{5}$ of the horizontal mass convergence; the haining $\frac{4}{5}$ is carried up by the vertical current. (*Same item as* 2.10 78, Oct. 1951, *MAB.*) *Subject adings:* **1. Typhoon mechanics 2. Typhoon rainfall 3. Typhoon "Kitty" (1949) 4. Japan.** *E.P.B.*

7K–85 551.515.221

Magata, M., **Dynamics of the eye of storm.** *Papers in Meteorology and Geophysics,* 1(1):29–37, t. **1950.** 3 figs., 10 refs., 29 eqs. **DWB**—Author shows mathematically that in a stationary ular cyclonic system without friction there is a central area into which no wind blows, separated m the outer zone by a wind discontinuity. He also calculates vertical velocity and finds that in tain conditions of size of eye in relation to pressure distribution, there may be descending currents hin the eye. (*Same item as* 2.7–87, July 1951, *MAB.*) *Subject Headings:* **1. Cyclone structure Dynamics of the atmosphere.**—*C.E.P.B.*

7K–86 551.515.2

*Malurkar, S. L., **Tropical cyclonic storms.** *India. Meteorological Department, Memoirs,* (4):172–201, **1950.** numerous figs., tables, and refs. (Ch. 3 of his: **Notes on analysis of weather India and neighbourhood**). **DLC**—Formation and development of tropical cyclones are analyzed d discussed. Incursion of EM (equatorial maritime air) from other side of the equator along th simultaneous influx of TR (Far Eastern transitional air) and TC (Tropical continental air) med depression in every instance as observed by the author. Cyclonic storms are guided by nds of 4 and 8 km in the sector containing the "source" EM mass. Recurving storms have but o sectors. *Subject Headings:* **1. Tropical cyclones 2. Typhoon formation.**—*W.N.*

7K–87 551.515.23(52)

Matsukura, H., **A study of the movement of typhoon.** *Journal of Meteorological Research,* okyo, Vol. 2, Suppl. No.: 51–54, Aug. **1950.** fig., 18 charts. In Japanese; English summary p. 108. **WB**—Paths of successive typhoons are often similar. They tend to move towards negative essure anomalies (15-day mean) and to avoid Japan when it is covered by a region of positive omaly. (*Same item as* 2.4–88, April 1951, *MAB.*) *Subject Headings:* **1. Typhoon tracks 2. Japan.** *C.E.P.B.*

7K–88 551.515.23

Nishimura, D., **On the structure of typhoon, Pt. 1.** *Geophysical Magazine,* Tokyo, 21(2):107–22, March **1950.** 5 figs., 2 tables, 11 refs., 25 eqs. **DLC**—The author cites data on the temerature, relative humidity and pressure relationships prevailing within the eye of a typhoon and on e evidence of a thermal discontinuity on the boundary of the eye. An approximate solution of the quations of motions is presented in terms of vertical motion and eddy viscosity when the isobars e circular, and a dynamical equation for the formation of the eye of typhoons is formulated under e condition that the direction of the wind becomes tangential to the circular isobar of the boundary. (*Same item as* 11–73, Nov. 1950, *MAB.*) *Subject Headings:* **1. Typhoons 2. Hurricane structure.** *I.L.D.*

7K–89 551.515.227:551.509.31(52)

Okubo, A. and Nakamura, N., **Cold stratosphere accompanying a typhoon.** *Meteorological ociety of Japan, Journal, 2nd Ser.,* 28(4):107–112, April **1950.** 4 figs., 3 tables. In Japanese; nglish summary p. 112. **DWB**—A very cold stratosphere (below −70°C) is often found in front f typhoons, probably brought from equatorial regions. A typhoon tends to move along a cold rough towards this cold tip and recurves or fills up if warm air invades it. When the stratosphere above −60°C typhoons will not occur in Japan. (*Same item as* 2.4–87, April 1951, *MAB.*) *ubject Headings:* **1. Typhoon formation 2. Typhoon forecasting 3. Japan.**—*C.E.P.B.*

7K–90 551.515.2:551.501.8

§Rodewald, M., **Neue Einblicke in die Taifune.** [New views concerning typhoons.] *Die Naturwissenschaften,* 37(22):518–522, Nov. **1950.** 9 figs., 37 refs. **DWB**—A brief report listing new nd unusual opinions advanced by meteorologists throughout the world regarding typhoon characterstics and typhoon analysis—conclusions made possible largely through the analysis of radar, radiosonde and aircraft data obtained in recent years. Illustrative charts are included. (*Same item ts* 2.4–84, April 1951, *MAB.*) *Subject Headings:* **1. Typhoons 2. Upper air analysis.**—*R. S. Quiroz.*

7K–91 551.515.2(261)

§Sawyer, J. S. and Ilett, Betty, **When hurricanes come north.** *Weather,* 5(6):210–217, June **1950.** 5 figs., table, 4 refs. **DWB**—TANNEHILL's tracks of hurricanes 1901–39 were extended into

temperate latitudes; 31% reached N.E. Atlantic. Analyzed by 10° squares with speed in kn and time taken. Transformation into extratropical depressions shown by synoptic charts. havior and interaction with polar front described. (*Same item as* 8–44, Aug. 1950, *MAB.*) *Sub Headings:* **1. Hurricane tracks 2. North Atlantic.**—*C.E.P.B.*

1951

7K–92 551.515.2:551.577

Ando, T., **Rainfall accompanying typhoon.** *Meteorological Society of Japan, Journal, Ser* 29(1):20–27, Jan. **1951.** 9 figs., eqs. In Japanese; English summary p. 27. **MH-BH**—A stream precedes a typhoon by some hundreds of kilometers and causes heavy rain controlled by mixing ratio. Rainfall is of two kinds, vortical at the place of vorticity accumulation and mov with it, and that due to a line of convergence which moves north as a wave-like disturbance. (*Sa item as* 3.4–204, April 1952, *MAB.*) *Subject Heading:* **1. Typhoon rainfall.**—*C.E.P.B.*

7K–93 551.515.23(2

§Cressman, George P., **The development and motion of typhoon "Doris," 1950.** *Americ Meteorological Society, Bulletin,* 32(9):326–333, Nov. **1951.** 14 figs., 13 refs., 5 eqs. **DWB**— detailed history of a typhoon which originated at a very low latitude (5°–6°N) near Truk early May 1950, and moved in an erratic course toward Guam and Iwo Jima. Discussion is support by charts on the synoptic situation and cloud distribution and a table of pressure changes. Seve conclusions are drawn as to the general nature of a typhoon and significant features of the report case indicated, such as development of the storm from two centers, unusually low latitude of form tion, oscillation of the cyclone, motion to the north and others. (*Same item as* 3.5–163, May 19 *MAB.*) *Subject Headings:* **1. Typhoon "Doris" (1950) 2. Typhoon tracks 3. Western Paci** —*G.T.*

7K–94 551.515.23:551.509.3(75

Gentry, Robert C., **Forecasting the formation and movement of the Cedar Keys hurrican September 1–7, 1950.** *Monthly Weather Review,* 79(6):107–115, June **1951.** 11 figs., 2 tables, 8 re **DWB**—An analysis of the origin, development, movement and conditions attending the erra hurricane that remained around the Florida peninsula for several days. Methods of forecasti used, especially the application of the steering concept (winds at 30,000 ft or the top of the storm we used) which proved to be the most successful, are described and illustrated. The fact that the enti life history of the storm could be followed by the network of U. S. or Cuban upper air or rad stations, enabled a close watch to be kept on its loopy trajectory and the changes in its structu (*Same item as* 3.7–108, July 1952, *MAB.*) *Subject Headings:* **1. Hurricane formation 2. Hurrica forecasting 3. Hurricane, Cedar Keys, Fla. (1950) 4. Florida.**—*M.R.*

7K–95 551.582.2(5

*†Gherzi, Ernesto, **The meteorology of China.** Macao, Serviço Meteorológico, **1951.** 2 figs., maps, graphs, tables, 198 refs. **DWB**—One of the most comprehensive works on the clim tology of an area ever published. The manuscript was ready for the printer in 1939 but publicatio was delayed due to the war. After the war it was supplemented, but during the occupation Zi-ka-wei in 1949 these revisions were lost, and so the present work is essentially that which w ready for printing in 1939. There are two volumes: Vol. I contains a detailed discussion (wit numerous charts, tables graphs and diagrams) of air masses, pressure, temperature, cold wave hot waves, rain, humidity, wind at surface and aloft, extratropical cyclones, tropical cyclones and discussion of the "climatic regions" of China (52 areas). Numerous tables of local weather record and an index add to the value of this work. Vol. II is a large compilation of detailed tables an graphs, synoptic charts, storm tracks, microseism records, climagrams, barograms for typhoon upper level charts (mean), soundings, contingency tables for temperature, humidity, evaporatio rainfall, fog, surface winds, upper air winds, frost, gusts, isentropes, etc. The variety of materi and types of presentation is astonishing. The number of stations for which data are compiled vari from 1 to 215. Of course the most competent portion is that which deals with typhoons, sin FATHER GHERZI has made a lifetime study of tropical storms in the Far East. Many of the illu trative synoptic charts for typhoon situations are in color. The printing and paper are first clas though typographical errors are numerous in some sections. A valuable station location chart included. (*Same item as* 3.10–6, Oct. 1952, *MAB.*) *Subject Headings:* **1. Climate of China 2. T phoons 3. Synoptic studies 4. Climatic data 5. China 6. Far East.**—*M.R.*

7K–96 551.515.2:551.509.3(262,263.

Guilmet, B. and Zonzon, J., **Note sur la météorologie tropicale.** [Note on tropical meteo ology.] *La Météorologie,* 4th Ser., No. 21:32–48, Jan.–March **1951.** 9 figs. French, English a Spanish summaries p. 32. Also; Guilmet, B. **Pt. 2, Introduction au bulletin d'études météorolog**

du groupe Antilles-Guyane. [Introduction to the bulletin of studies of the Meteorological ice of the Antilles-Guiana group.] *Ibid.*, No. 22:77–97, April–June, **1951.** 16+ figs., bibliog. 5–97. French, German and Spanish summaries, p. 77. **DWB**—First part summarizes: 1) the sical and dynamic properties of tropical air masses and currents, 2) methods of analysis employed ne intertropical zone, and 3) the properties of the principal types of tropical circulation observed the North Atlantic and the Caribbean. Second part opens with a review of hurricane fore- ing methods and analysis. Next, some features of air masses and movement in the trade wind of the Western Atlantic and Caribbean are discussed. Structural features of hurricanes of , Sept. 1946 and of June 1947 are shown graphically. Charts of six possible synoptic situations given. (*Same items as* 3.1–86, Jan. 1952 and 3.7–105, July 1952, *MAB.*) *Subject Headings:* **Tropical meteorology 2. Hurricane analysis 3. Hurricane forecasting 4. North Atlantic an 5. Caribbean Sea.**—*I.L.D., M.R.*

7K–97 551.515.21:551.542(52)

Hashimoto, M., **On the movement of typhoon (2).** *Journal of Meteorological Research*, Tokyo, (14/15):467–473, Dec. **1951.** 6 figs., 3 refs., 14 eqs. In Japanese; English summary, p. (31). **B**—A method is proposed, to compute from weather charts, the general pressure field which des the movement of typhoon, and by this method it is possible to obtain the general pressure d from surface and 500 mb weather charts. The relation between the general pressure field and observed velocity of the typhoon is investigated qualitatively and quantitatively. It is found t the velocity of a typhoon depends not only on the general pressure field at the surface but also that at 500 mb level. (*Same item as* 4.2–116, Feb. 1953, *MAB.*) *Subject Headings:* **1. Typhoon ks 2. Pressure fields 3. Typhoon velocities 4. Japan.**—*Author's abstract.*

7K–98 551.515.23

Haurwitz, Bernhard, **The motion of binary tropical cyclones.** *Archiv für Meteorologie, Geo- sik und Bioklimatologie, Ser. A*, 4:73–86, **1951.** 3 figs., table, 4 refs., 9 eqs. English, German French summaries p. 73. **DWB**—It is often observed that two adjacent tropical cyclones ate counterclockwise round each other. The author discusses this motion assuming a binary kine vortex and obtains an equation from which the rate of rotation can be computed. Com- ed and observed rotations for 32 binaries 1900–1938 show little agreement but this is attributed to ccurate data. Nine recent cases give much better agreement. (*Same item as* 3.4–138, April 2, *MAB.*) *Subject Heading:* **1. Tropical cyclone movement.**—*C.E.P.B.*

7K–99 551.515.2(759,52)

James, R. W., **A note on the vertical structure of a typhoon.** *Monthly Weather Review*, 79(11): –207, Nov. **1951.** 2 figs., 9 refs., eq. **DWB**—Author compares vertical structure of typhoon itty" as determined at Tokyo with structure of a hurricane over Tampa, Fla. on Oct. 19, 1944 l finds two characteristic decay rates in both instances, which leads him to conclude that a general ttern for tropical lows exists. It is also found that a similar vertical structure characterizes ture extratropical disturbances. (*Same item as* 3.7–106, July 1952, *MAB.*) *Subject Headings:* **Tropical cyclone structure 2. Typhoon "Kitty" (1949) 3. Florida 4. Japan.**—*G.T.*

7K–100 551.515.2

James, R. W., **On the evolution of tropical cyclones.** *Journal of Meteorology*, 8(1):17–24, Feb. 51. 5 figs., 9 refs., 8 eqs. **DWB**—This article is a theoretical two-dimensional study of hurricane velopment by means of a simplified barotropic model of the hurricane vortex. Vortex formation xplained by the withdrawal of air from the center and the creation of the circulation mechanism Rayleigh and Brunt so that there is a steady change from anticyclonic to cyclonic absolute rticity. The concept energy ratio $E=\frac{1}{2}\rho_1 v^2/h$, which is a measure of particle stability or in- bility and hence of absolute vorticity, was applied to the study of 32 hurricanes in southeastern S. Simple hurricane models were set up. On the basis of particular wind profiles their structure l development were studied and the energy ratio was compared with those of actual hurricanes. constant E model approximated roughly an actual hurricane; its total kinetic energy increased a ndredfold with maturity and the greatest energy changes occurred during the mature stage of clonic vorticity. (*Same item as* 2.8–69, Aug. 1951, *MAB.*) *Subject Headings:* **1. Tropical cyclones Hurricane theory.**—*I.L.D.*

7K–101 551.515.21(52)

Kamiko, T., **The distribution of vertical instability in the neighborhood in tropical cyclones.** *eteorological Society of Japan, Journal, 2nd Ser.*, 29(6):194–198, June **1951.** 11 figs., 7 eqs. In panese; English summary p. 198. **MH-BH**—Author calculated the distribution of vertical latent tability over Japan from aerological data of temperature and humidity during approach of phoons. He found maxima of instability in the periphery of storms and in the direction of motion.

(*Same item as* 3.4–133, April 1952, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Ver instability 3. Japan.**—*C.E.P.B.*

7K–102 551.515.21(52):55

Kanaya, Kozo, **On the effect of the dynamical pressure near the center of typhoon.** *J Marine Observatory, Memoirs*, 9:1–8, March **1951.** graphs, tables, biblio., eqs. **DWB**—Pres differences between Muroto and Tsuro are tabulated for each hour from 11 p.m., Sept. 2 to 4 p Sept. 3, 1950, during the passage of the "Jane" typhoon over the Kansai District (near Kc Japan. It is assumed that the pressure difference before and after the typhoon was mainly static pressure effect, whereas the anomalous or w-shaped curve of departures from this static pres difference (reaching −8 mb before passage of center, 2 mb at center and −6 mb after passag center) would be due to dynamic effects of the hurricane structure near its center. Theore curves are shown to agree essentially with observed. (*Same item as* 3.2–85, Feb. 1952, *MA Subject Headings:* **1. Typhoon dynamics 2. Typhoon pressure 3. Typhoon "Jane" (1950) 4. K sai District, Japan.**—*M.R.*

7K–103 551.51

Kleinschmidt, Ernst, Jr., **Grundlagen einer Theorie der tropischen Zyklonen.** [Basis o theory of tropical cyclones.] *Archiv für Meteorologie, Geophysik und Bioclimatologie, Ser.* 4:53–72, **1951.** 3 figs., 16 refs., 53 eqs. German, English and French summaries p. 53–54. **DW** In developing tropical cyclones, air flows inwards near the sea due to friction and outwards in middle troposphere. The boundary is determined by the temperature excess in the central reg which excess therefore cannot exceed a moderate value. The initial conditions in which a cycl can develop are shown in a diagram. Two possible causes are considered: masses with a h value of ERTEL's Z in the trade overlain by weak Z, and nonadiabatic processes associated v shower activity. Author then constructs a model of a fully developed moderate cyclone, show moist potential isotherms, gradient winds and air circulation. The energy balance of a cycl and characteristics of the eye are discussed quantitatively. (*Same item as* 3.4–135, April 19 *MAB.*) *Subject Headings:* **1. Tropical cyclone theory 2. Energy of tropical cyclones.**—*C.E.P.B*

7K–104 551.511:551.515

James, R. W., **On the theory of large-scale vortex motion in the atmosphere.** *Royal Mete logical Society, Quarterly Journal*, 76(329):255–276, July **1950.** 3 figs., table, 6 refs., 35 eqs. A Knighting, E., [**Discussion of**] **Large-scale vortex motion in the atmosphere.** *Ibid.*, 77(331):1 137, Jan. **1951.** Reply by James, *Ibid.*, p. 137–138. refs., eqs. Also: [**Further discussion**] Knighting and **Reply** by James, *Ibid.*, p. 309–310. **DWB**—In a highly mathematical discuss author re-examines the symmetrical vortex theory of the cyclone, using as fundamental parame the intensity (pressure defect at the center) and spread radius (distance from center to maxim gradient). General expressions are found for the mass defect, total potential energy and total kin energy of geostrophic winds; these are estimated for 17 intense mature cyclones. The ratio of m geostrophic energy to mean potential energy is found to be about 0.08. The pressure profil roughly the same for all symmetrical lows. The kinetic energy of ageostrophic motion is discussed. The treatment is then extended to elliptical vortices, troughs and wedges and a "fr is shown to be formally represented by a line distribution of circular vortices. Finally, a theor the mutual interaction of quasi-geostrophic vortices is put forward. (*Same items as* 9–53, Sept. 1 and 2.6–47, June 1951, *MAB.*) *Subject Headings:* **1. Cyclones 2. Vorticity.**—*C.E.P.B.*

7K–105 551.515.21

§Miyamoto, Masaaki, **On the typhoon Missatha; on the structure and movements of typho** *Kobe, Japan. Marine Observatory, Memoirs*, 9:47–50, March **1951.** graphs, refs. **DWB**—Dat structure and movement of typhoon "Missatha" of Sept. 18, 1950 and other earlier typhoons indi that erratic movements are often due to cellular structure within the general typhoon system. cellular vortexes, which are of the order of 100–200 km. diameter ($^1/_{25}$ area of full typhoon) are acc panied by more severe wind systems than the main typhoon, but travel at about $\frac{1}{4}$ the speed of main system and in a direction which is not consistent with the general movement. Track several of these vortexes are shown, and synoptic charts illustrative of conditions give an ide the relative position of formation and movement of these cells. (*Same item as* 3.2–86, Feb. 1 *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Cellular vortexes 3. Typhoon "Missa (1950) 4. Japan.**—*M.R.*

7K–106 551.50

Oosawa, Koichiro and Nagayama, Moriyoshi, **3-day forecasting of the typhoon track by broad-weather analysis.** *Oceanography and Meteorology*, Nagasaki, 5(3/4):70–74, Dec. 1

gs., 3 refs. In Japanese; English summary p. 74. **DWB**—The forecasting method developed is paper is based on information derived from four charts: 1) forecast-day weather map showing k of typhoon, 2) chart of deviation from normal of 5-day mean pressure, 3) 5-day pressure change t and 4) 2-day pressure change chart. These four charts are presented and analyzed for each x typhoons which occurred during the summer season of 1951. General rules of the development yphoons are derived from the analysis. (*Same item as* 4.5 62, May 1953, *MAB.*) *Subject dings:* **1. Synoptic forecasting 2. Short range forecasting 3. Typhoon tracks.**—*G.T.*

7K–107 551.515.2:551.465(267.4)

Rodewald, Martin, **Bericht über einen zyklonischen Monsun-Sturm im Golf von Bengalen.** eport on a cyclonic monsoon storm in the Bay of Bengal.] *Wetterlotse*, No. 30/31:1–10, Nov. 1. 2 figs. **DWB**—Describes cyclone of July 19–25, 1951, as experienced on the "D. Mai kmers," which passed through the "eye." The conflict of wind and current is discussed. (*Same as* 5.10–114, Oct. 1954, *MAB.*) *Subject Headings:* **1. Tropical cyclones 2. Bay of Bengal.** *C.E.P.B.*

7K–108 551.515.23(52)

Saito, N., **Two cyclones with abnormal path.** *Journal of Meteorological Research*, Tokyo, :63–69, Jan. **1951.** 5 figs., table, 3 refs., eqs. In Japanese; English summary p. (2). **DWB**—ese cyclones were of tropical origin and had moved northward with a high speed towards Japan. h were characterized by a deep cold pool on the foreside of the cyclone with cyclogenesis on the posite side of the cold pool. It is shown that warm air advection above the 500 mb level and the er cold pool were important in cyclogenesis. (*Same item as* 3.10 125, Oct. 1952, *MAB.*) *Subject adings:* **1. Tropical cyclones 2. Cyclogenesis 3. Cyclone tracks 4. Japan.**—*From author's tract.*

7K–109 551.515.21:551.515.3(52)

Syōno, S.; Ogura, Y.; Gambo, K. and Kasahara, A. (*Geophysical Inst., Tokyo Univ.*), **On the gative vorticity in a typhoon.** *Meteorological Society of Japan, Journal, Ser. 2*, 29(12):397–415, c. **1951.** 28 figs., refs., eqs. English summary p. 397. **DWB**—Analysis of the fine structure of phoons revealed small convective cells of about 50–100 km in diameter with positive and negative rticity embedded in the large vortex. Drawings show the distribution of vorticity at different els and their connection with the intensity of rainfall. A formula is given for the quantitative tribution of "vortical rains." The theory of oscillations within these small vortex cells is out- ed. (*Same item as* 5.10–118, Oct. 1954, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Cel- ar vortices 3. Japan.**—*A.A.*

7K–110 551.515.2:551.557.2(52)

Uwai, K., **Generation and movement of tropical storms at the 700 mb surface (On the typhoons d tropical cyclone-groups in 1950, Pt. 1).** *Journal of Meteorological Research*, Tokyo, 3(12):417–0, Sept. **1951. DWB**—The mechanism of the generation of tropical storms, their motions, in- nation, change of the axis of vertical motion and its relation to the motion of the storms, variation the stream line structure and its relation to storm development and distribution of the generating nces were studied at the 700 mb level by applying streamline analysis to radiosonde and aircraft servations. A detailed study of a number of typhoons and tropical storms occurring off Japan made. (*Same item as* 3.5–161, May 1952, *MAB.*) *Subject Headings:* **1. Typhoon mechanics Streamline analysis 3. Typhoons, Japan (1950) 4. Japan.**—*I.L.D.*

7K–111 551.515.21(265/266)

Watanabe, K., **Some studies on typhoons of 1949 and 1950, Pt. 1, Typhoon eye.** *Meteorological ciety of Japan, Journal, 2nd Ser.*, 29(9):314–319, Sept. **1951.** 6 figs., ref. In English; Japanese mmary p. 318–319. **MH-BH**—Changes in the shape and diameter of the eye of 16 typhoons udied by aircraft in the Pacific 1949–50 are tabulated for formative, immature, mature and decay ges and summarized. The boundary is a sort of frontal surface; along the I.T.C. the eye becomes ngated or tilted. When the cloud ring is broken the position of the opening affects the distribution wind and weather and the deepening or filling of the typhoon. (For Pt. 2, *see* 7K–132.) (*Same m as* 3.10–124, Oct. 1952, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Pacific Ocean.** *C.E.P.B.*

1952

7K–112 551.515.23:551.515.22

Ando, T., **On the relation between intensity and velocity of typhoon.** *Journal of Meteorological esearch*, Tokyo, 4(1):10–14, March **1952.** 4 figs., 3 tables, 3 refs., 12 eqs. In Japanese; English

summary p. (1). **DLC**—Data on the correlation between central pressure of a typhoon an northward velocity, between mean radius and mean velocity and between intensity and distan latitudinal displacement are presented and discussed. It is found that "northward moveme strong typhoons is generally faster than that of weak typhoons," which is attributed to the e of the Rossby force. (*Same item as* 4.5–103, May 1953, *MAB.*) *Subject Headings:* **1. Typ velocities 2. Typhoon mechanics.**—*G.T.*

7K–113 551.515.21:551.515.81(

Arakawa, Hidetoshi (*Met. Res. Inst., Japan*), **The characteristic structure of the occl frontal typhoon in the late fall other than the occlusion of wave shaped frontal perturbations.** *eorological Society of Japan, Journal, 2nd Ser.*, 30(7):211–216, July **1952.** 2 figs., 3 refs. In anese; English summary p. 211. **DWB**—The development of typhoon "Ruth" is described illustrated by surface, 700-mb and 500-mb charts for Oct. 14, 15 and 16, 1951. The structur this typhoon is offered as evidence in support of PALMÉN's statement that many cyclones w appear as occluded fronts on a surface map, have never gone through a real process of occlusion, if they show a structure comparable to that of genuine occluded polar front perturbations. (S *item as* 4.7–78, July 1953, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Occlusions 3. F tal perturbations 4. Typhoon "Ruth" (1951) 5. Pacific Ocean.**—*G.T.*

7K–114 551.515.2

Arakawa, Hidetoshi (*Met. Res. Inst.*), **Mame-Taifu and Midget typhoon.** *Geophysical Maga* Tokyo, 23(4):463–474, May **1952.** 6 figs., 7 refs. **DLC**—The mame-taifu is a small storm typhoon intensity. The vertical structure of small storms is discussed with the aid of aerolog soundings (presented graphically) made during the storms of Aug. 1950 off Japan. The charac istic subtropical cyclones in the Northwest Pacific are generally very small storms as compared the normal typhoon, and the subtropical cyclone may develop into the *mame-taifu.* (*Same item* 4.8–101, Aug. 1953, *MAB.*) *Subject Headings:* **1. Subtropical cyclones 2. Japan.**—*I.L.D.*

7K–115 551.551:551.5

Arakawa, H., **Severe turbulence resulting from excessive windshear in tropical cyclo** *Journal of Meteorology*, 9(3):221–223, June **1952.** 2 figs., 10 refs., 7 eqs. **DWB**—Criteria increase of turbulence are discussed. Author's 1941 expression $\partial v_0/\partial r > 2v_0/r$ (r = radius of curvat is evaluated for center of a typhoon. Results agree with observations on a flight into a typhoo showing strong shear and turbulence 5 mi inside typhoon eye. (*Same item as* 3K–187, Nov. 1 *MAB.*) *Subject Headings:* **1. Atmospheric turbulence 2. Typhoons.**—*C.E.P.B.*

7K–116 551.515

Cressman, George P. (*Hq. Air Weather Service, Wash., D. C.*), **Northward acceleration typhoons.** *American Meteorological Society, Bulletin*, 33(6):243, June **1952.** 4 refs. **DW** Since the net pressure force acts on a vortex which is almost equal to one half the resultant of Coriolis force and is oppositely directed (in contrast to ROSSBY's statement that the total northw force on a vortex is the resultant of the Coriolis force) and since the low level circulation of typho is much more symmetrical than previously supposed, the author recalculates the accelerations termined in a previous article (*see item* 3.5–163, May **1952,** *MAB*). "The resulting acceleratio for example 1, 2 and 3 should be respectively $\frac{1}{2}$, 2 and $8\frac{1}{2}$ kn/day." (*Same item as* 4.7–85, July 19 *MAB.*) *Subject Headings:* **1. Typhoon tracks 2. Coriolis force.**—*I.L.D.*

7K–117 551.509.52:551.51

Dano, Agapito L., **Steering principle on typhoon movement.** *Philippines. Weather Bure The Elements*, 3(11):13, Nov./Dec. **1952.** **DWB**—Two aids to typhoon track forecasting are cussed: a) the use of circulation charts of the steering level and b) a technique derived from asymmetrical distribution of wind velocities around the typhoon. *Subject Headings:* **1. Typh forecasting 2. Steering.**—*G.T.*

7K–118 551.515.21(

§Fujita, Tetsuya, **Study on pressure dips within Typhoon Della. 1952.** p. 52–61 from identified reprint. 11 figs., 11 refs. **DWB**—A study on a microstructural detail of tropical storm the pressure dip, which must be distinguished from a pressure kink associated with a cold fr passage. The dip, a trough-like depression, moves at the steering velocity of the main storm can be located in different sectors of the typhoon. The winds are quite different from gradi winds. The connection with precipitation areas is shown. A similar phenomenon was observe hurricanes. *Subject Headings:* **1. Tropical storms 2. Pressure dips 3. Typhoon "Della" (19 4. Japan.**—*A.A.*

7K–119 551.515.23

Gentry, Robert C. (*U. S. W. B., Miami, Fla.*), **Note concerning northward force acting on icanes.** *American Meteorological Society, Bulletin,* 33(8):321, 325, 331, Oct. **1952.** Reply by ', Cressman, p. 331, 338. 4 refs. **DWB**—The author maintains that Cressman (*see* 7K–93) estimated the size of the northward force F in the typhoon "Doris." Cressman used Rossby's mption that the speed is everywhere constant on any radius from the center and failed to average magnitude of F over the full depth of the circulation. Since F is much weaker than Cressman oned, "Doris" moved northward by the steering of the upper winds. Cressman replies that as e appears to be little change in the radial velocity profile through the layer from 1500 ft above level to 700 mb surface, it is the variation of Coriolis force with latitude that causes northward vement. The role of steering is questioned. (*Same item as* 4.7–86, July 1953, *MAB.*) *Subject dings:* **1. Typhoon "Doris" (1950) 2. Typhoon tracks 3. Coriolis force 4. Steering current.** ressman, G. P.—*I.L.D.*

7K–120 551.515.21

Haque, S. M. A., **The initiation of cyclonic circulation in a vertically unstable stagnant air mass.** *al Meteorological Society, Quarterly Journal,* 78(337):394–406, July **1952.** 3 figs., 5 refs., 44 eqs. **'B**—Equations of motion derived in cylindrical co-ordinates are applied to investigate the perbations in a vertically unstable stagnant mass having infinite lateral extent and confined between horizontal planes. A complete solution of the perturbation equation with the boundary conditis is derived. The boundary conditions are then varied by surrounding and surmounting the table air mass by stable air. It is shown that the horizontal extent of the unstable air mass a definite upper limit which depends on the magnitude of instability, height of the disturbance, the Coriolis parameter. The mathematical analysis is then applied to show that a tropical lone may originate from vertical instability. It is shown by a numerical illustration that the tribution and order of magnitude of the different meteorological elements are the same in the thematical model as observed in the initial stages of a tropical cyclone. (*Same item as* 3.11–122, v. 1952, *MAB.*) *Subject Headings:* **1. Tropical cyclone dynamics 2. Tropical cyclone theory.**—*thor's abstract.*

7K–121 551.515.21:551.577(265/266)

Hughes, Lawrence A., **On the low-level wind structure of tropical storms.** *Journal of Meteorgy,* 9(6):422–428, Dec. **1952.** 10 figs., table, 10 refs. Also: Ramage, C. S. and Hughes, Lawnce A., **The distribution of rain in tropical storms.** *Ibid.,* 10(4):300–302, Aug. **1953.** 8 refs. **VB**—Eighty-four reconnaissance flights into 28 Pacific tropical storms at about 1000 ft were alyzed, including 5 in a stationary storm. Composite isolines show tangential velocity, trajectories ative to center, radial velocity, divergence and vertical motion; and average rainfall gives a value 436×10^{24} ergs/day in a 3° radius. Ramage questions Hughes' explanation of sudden change of face friction when typhoons move over land, and resulting precipitation. Hughes replies at ngth. (*Same items as* 4.7–80, July 1953 and 5.3–159, March 1954, *MAB.*) *Subject Headings:* **Typhoon structure 2. Typhoon rainfall 3. Pacific Ocean.**—*C.E.P.B.*

7K–122 551.515.2(72)

Ives, Ronald L. (*Indiana Univ.*), **Hurricanes on the west coast of Mexico.** *Pacific Science ngress, 7th, 1949, Auckland and Christchurch, N. Z., Proceedings,* 3:21–31, pub. **1952.** 3 figs., refs. **DWB**—Frequency, behavior, magnitude and trajectory of Mexican west-coast hurricanes here outlined, on the basis of information available up to 1948; the known and suspected effects of ese hurricanes are discussed and the need for further study of these disturbances, both along eir trajectories and in areas extending many miles beyond them, is noted. *Subject Headings:* **Hurricanes 2. Mexico.**—*Author's abstract.*

7K–123 551.515.21

*Jordan, Elizabeth S. (*Univ. of Chicago*), **An observational study of the upper wind-circulation ound tropical storms.** *Journal of Meteorology,* 9(5):340–346, Oct. **1952.** 14 figs., 10 refs. **DWB**—ll available (130) wind data, 4000–45,000 ft, in Pacific and Atlantic tropical storms were combined d plotted with reference to storm center. Charts show large-scale features—tangential cyclonic locity (kn) at 7000, 18,000, 30,000, 40,000 and 45,000 ft (from 30,000 ft up, anticyclonic circulation croaches on center), vertical shear, vorticity, and radial component and stream lines at 7000 and 5,000 ft. The latter shows a ring of outflow and clockwise circulation round an inner core where rculation is still cyclonic. (*Same item as* 4.2–118, Feb. 1953, *MAB.*) *Subject Headings:* **1. Hurrine structure 2. Wind data.**—*C.E.P.B.*

7K–124 551.515.21

Jordan, Charles L., **On the low-level structure of the typhoon eye.** *Journal of Meteorology,* (4):285–290, Aug. **1952.** 6 figs., 2 tables, 7 refs. **DWB**—Dropsonde and aircraft soundings in

8 typhoons in W. Pacific are combined in curves of mean temperature and dew point in and outsid for heights up to 3 km. The eye shows greater stability and higher and more variable temperat Air in eye was either very dry or nearly saturated. A dropsonde from 500 mb indicated dry adia descent from 200 mb to about 1 km. Structure of eye is: subsidence layer down to 500–700 vertical and lateral mixing with some cloud down to a shallow moist sub-cloud layer with no ver mixing. (*Same item as* 4.2–117, Feb. 1953, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. of typhoon.**—*C.E.P.B.*

7K–125 551.51

Koschmieder, Harald, **Zur Theorie der Hurricane.** [On the theory of hurricanes.] *Germa Deutscher Wetterdienst in der US-Zone, Berichte*, No. 35:79–85, **1952.** 12 figs. **DWB**—The namics of a hurricane are discussed on the basis of an upward current in the eye between gr and a blocking layer, above which is a down current. The resulting pressure profile agrees that of a Florida hurricane. (*Same item as* 3.10–123, Oct. 1952, *MAB.*) *Subject Heading:* **1. H cane dynamics.**—*C.E.P.B.*

7K–126 551.5

Masuda, Y. (*Met. Res. Inst., Japan*), **On the small perturbations superposing upon the circ vortex, Pt. 1–2.** *Papers in Meteorology and Geophysics*, Tokyo, 3(2):138–156, Aug. **1952.** 10 f table, 4 refs., eqs. **MH-BH**—From the analysis of vorticity in the case of the typhoon, it is fo that small perturbations are superposed upon the circular vortex (seemingly uniform at a gla and that they travel as wave-motions. In an attempt to explain this phenomenon, approxim solutions of the perturbation equation of the circular vortex whose basic currents are gradient w are obtained, and this theoretical result is compared with the analysis. (*Same item as* 5.2– Feb. 1954, *MAB.*) *Subject Heading:* **1. Vorticity in typhoons.**—*Author's abstract.*

7K–127 551.515.83:551.583.13:551.51

Matsukura, H., **The secular change of equatorial front, air temperature and number of typh occurrence.** *Journal of Meteorological Research*, Tokyo, 4(5):163–168, Aug. **1952.** 7 figs. Japanese; English summary p. (13). **DLC**—The author investigated the secular change of equato front and obtained the following results: (1) 27–30 year period of south-north or east-west oscillat of equatorial front in summer season coincides with the period of air temperature at Ishinomak Aug. (2) Latitude variation of recurvature point of typhoon has a 10–11-year period. (3) Cur ture of typhoon path may be an index of general circulation, and the index has a 7–8-year peri When the index has maximum value, typhoon moves northward, while minimum index me westward movement. (4) In cold summer there often occur southward movement of equato front and eastward movement of polar front, and in hot summer the reverse relation holds go (*Same item as* 5.5–116, May 1954, *MAB.*) *Subject Headings:* **1. Tropical fronts 2. Typhoon tra 3. Weather cycles 4. Japan.**—*Author's abstract.*

7K–128 551.515.2:551.583.13(2

*Nagamitsu, E., **Periodicity of the appearance of typhoon.** *Journal of Meteorological Resea* Tokyo, 4(7):373–374, Oct. **1952.** 2 tables. In Japanese; English summary p. (25). **DL** Typhoons which appear in the West Pacific Ocean are classified into 5 series according to the relat between their initial position and their pressure pattern. It is found that typhoons in each se appear approximately every 36 days. *Subject Headings:* **1. Typhoon statistics 2. Typhoon pe dicities 3. Western Pacific.**—*Author's abstract.*

7K–129 551.511:551.513.2:551.

Queney, Paul (*Univ. of Paris*), **Les ondes atmosphériques considérées comme associées discontinuités du troubillon.** [Atmospheric waves associated with vorticity discontinuiti *Tellus*, 4(2):88–111, May **1952.** 10 figs., table, 10 refs., 62 eqs. English summary p. 88–89. **D** —A remarkably thorough theoretical treatment of the problems of long waves and cyclone wave an ideal atmosphere with one or two jet streams (two or three zonal currents) at about 12 km. work of Haurwitz, Platzman, Kuo, and Rossby and application of Cressman are reviewed. is pointed out that cyclogenesis is not produced by interaction of two air masses with differ temperatures but by action between a mass of cold air and warm earth or sea surface. The log development begins with the assumption of horizontal, nondivergent motion where, with constar the simple equation $Q^2\psi = 0$, where ψ is the local disturbance of the stream function. In Ch. 3 author derives the equation for the horizontal waves (in the absence of viscosity), first for the sim jet and then for the double jet. Four special cases are derived and illustrated diagramatica Next the effect of viscosity is introduced and the conclusion reached that on unstable waves wit quasi-simple jet the viscosity effect is practically negligible. In Ch. 5 application is made to semipermanent centers of action. Agreement with Rossby theory is good for the case of the sim

but for the double jet agreement is not good. In the final chapter a theory of cyclone waves is osed and it is suggested that this theory would apply to tropical cyclones and easterly waves in s where the jet stream penetrates into a monsoon area. The importance of this paper cannot ransmitted in the form of an abstract—it is recommended that the paper itself be read to be erly evaluated. (*Same item as* 4.8 89 Aug. 1953, *MAB.*) *Subject Headings:* **1. Waves in the terlies 2. Cyclogenesis 3. Jet stream.**—*M.R.*

7K–130 551.515.11(54)

Sen, S. N. and George, C. A. (*Regional Met. Center, Madras*), **An analysis of the Masulipatam one of October 1949.** *Indian Journal of Meteorology and Geophysics*, 3(4):264–277, Oct. **1952.** igs., 8 refs. **DWB**—An extensive synoptic analysis based mainly on surface, 2000 and 5000 ft ssure maps and height-time cross sections for selected stations shows the development of the re cyclone between three air masses (Tc, Tm and Em). The interaction of Tc and Tm air pro- d the active upglide surface of the warm front. Comparison made with a similar cyclone of 5. (*Same item as* 4.10–124, Oct. 1953, *MAB.*) *Subject Headings:* **1. Cyclogenesis 2. Cyclone icture 3. Cyclone, Masulipatam, India** (1949) **4. Masulipatam, India.**—*A.A.*

7K–131 551.515.22(265)

Simpson, Robert H. (*U. S. W. B., Wash., D. C.*), **Exploring eye of typhoon "Marge" 1951.** *erican Meteorological Society, Bulletin*, 33(7):286–298, Sept. **1952.** 11 figs., table, 12 refs. **DWB** n Aug. 1951 an unusual airplane reconnaissance of a mature typhoon succeeded in collecting ensive data from the eye and adjacent rain area of the storm. The eye, which was clear except a low stratocumulus undercast, was circular, 40 mi in diameter, and had a central pressure at surface of 26.43 in. (895 mb) with a sizable pressure gradient from the center to the edge of the . Walls of nimbostratus surrounding the eye rose like a huge coliseum to a height of 35,000 ft. o eye soundings from the surface to 17,000 ft were made, the first at midday, the second in late ernoon. These revealed exceptionally warm temperatures, more than 16°C at 17,000 ft, with se rates essentially isothermal from the surface to 10,000 ft. Marked cooling occurred between se two soundings in the layer 7,000–10,000 ft. Horizontally, temperature varied little at 800 at 9,000 ft, however, the eye center was nearly 8°C warmer, and at 18,000 ft, 18°C warmer n the adjacent rain area. At 9,000 ft significant temperature gradients were confined primarily the eye, while at 18,000 ft they were concentrated in the rain area. Photographs of convective udiness near the storm, views of the eye from various elevations, and of the radar view of the e of the typhoon "Marge," a surface map of the typhoon at 0600 (Aug. 15, 1951), a map showing e noon vertical temperature fields and a schematic vertical cross section of the eye are included. *ame item as* 4.5–101, May 1953, *MAB.*) *Subject Headings:* **1. Eye of typhoon 2. Typhoon Marge" (1951) 3. Western Pacific.**—*Author's abstract.*

7K–132 551.515.22

Watanabe, K. (*Central Meteorological Observatory, Tokyo*), **Some studies on the mechanism of phoon, Pt. 2, Pressure.** *Meteorological Society of Japan, Journal*, 30(4):126–131, April **1952.** figs., 2 tables, ref. **MH-BH**—Pressure characteristics of typhoons observed from 1949 to 1951 aerial means and from land or sea, are investigated. Typhoons are classified by minima of nter pressures into four groups which also represent differences in the mechanism of their develop- ent. The formation of typhoons through all stages of maturity and decay and the rate of their velopment are thoroughly discussed and illustrated. (For Pt. I, *see* 7K–111.) (*Same item as* 7–84, July 1953, *MAB.*) *Subject Headings:* **1. Typhoon mechanics 2. Atmospheric pressure.** *G.T.*

7K–133 551.515.2(914):550.342

Ylanan, Carlos W. (*Weather Bur., Manila*), **Typhoons and microseismic storms.** *International nion of Geodesy and Geophysics. Association of Seismology, Publications du Bureau Central Séismologique International, Ser. A. Travaux Scientifiques*, No. 18:91–107, **1952.** 3 tables, 3 figs. **DWB, LC**—Correlation between typhoons and microseismic disturbances has been the subject of study t the Weather Bureau Station at Diliman, Quezon City, during the two seasons that it has been in peration. This paper presents an evaluation of the results so far obtained. A summary of the ifferent typhoons and storms is presented together with the effects produced on the microseisms ecorded, with particular emphasis on amplitude. The effect of distance of the disturbance on mplitude is discussed and some instances of the effect of ocean depth are noted. Results point verwhelmingly to cyclonic origin of microseismic storms. (*Same item as* 5A–198, Jan. 1954, *MAB.*) *ubject Headings:* **1. Microseismic storm tracking 2. Typhoons 3. Quezon City, Philippine Islands . Pacific Ocean.**—*Author's abstract.*

1953

7K–134 551.509.312:551.515.2(2

§George, C. A. (*Regional Met. Centre, Calcutta*), **Thermal thickness patterns and tropical sto** *Indian Journal of Meteorology and Geophysics*, 4(4):279–290, Oct. **1953.** 16 figs., 17 refs. **DI** In this paper an attempt is made to illustrate the utility of the thermal thickness patterns on cons pressure charts for forecasting the life cycles of a few tropical storms in the Bay of Bengal. thickness patterns and the contour-thickness relationship seen on the 500 mb isobaric surface useful advance indications about the future movement and intensification or decay of the st under study, at least 12 hrs earlier than those evident from the synoptic charts. *Relative diverg* in accordance with SUTCLIFFE's development term was computed from the isopleths of $h_{500}+$ and the total thicknesses at the 500 mb surface and it was found that the patterns so obtained *qualitatively* in good agreement with the subsequent movement and development of the storms. also shown that the storms under study were steered mainly by the thermal winds at 500 mb sur over the warm sector rather than by the actual winds at 6 km. (*Same item as* 5.7–56, July 1 *MAB.*) *Subject Headings:* **1. Tropical storm forecasting 2. Thickness patterns 3. Tropical sto 4. Bay of Bengal.**—*Author's abstract.*

7K–135 551.515.21

Kasahara, Akira (*Geophysical Inst., Tokyo Univ.*), **A note on the vertical structure of the press and temperature fields in a typhoon.** *Meteorological Society of Japan, Journal*, 31(1):22–35, J **1953.** 9 figs., 12 refs., 21 eqs. **DWB**—Aerological data for typhoon "Ruth" (Oct. 8, 1951) analyzed, presenting a surface weather chart and numerous radial distributions of temperature height anomalies at constant pressure levels. Theoretical considerations for the distribution of vertical circulation are based on an analysis of motion continuity and polytropic change of the A fair agreement with observed temperature anomalies was reached. The polytropic isentr surface rather than the dry adiabatic one gives a time picture of vertical currents. (*Same item* 5.9–142, Sept. 1954, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Typhoon "Ruth" (19 3. Japan.**—*A.A.*

7K–136 551.515.21

Kato, H., **The analysis of the typhoon Ruth.** *Journal of Meteorological Research*, Tok 5(7):575–579, Aug. **1953.** 7 figs. In Japanese; English summary p. 575. **DLC**—The aut analyzed typhoon "Ruth" and obtained the following results: (1) At a higher level (like 10,000 the pressure change caused by a typhoon is of the same order or smaller than that caused by da change including error of observation. It is not now possible, therefore, to determine the inclinat of the low pressure axis at that level. (2) Typhoon "Ruth" was of the warm core type from earth's surface to the tropopause and possibly of the cold core type in the lower stratosphere. (3) T low pressure area of typhoon "Ruth" can be identified up to the height of 15 km, surrounded b high pressure belt. (5) The vortex area of the typhoon decreases with height and there is a fron surface between vortex flow and the general flow. *Subject Headings:* **1. Typhoon "Ruth" (19 2. Typhoon structure 3. Japan.**—*Author's abstract.*

7K–137 551.515.23

Krishna Rao, P. R. and Sen, S. N. (*Regional Met. Center, Madras*), **The severe Nagapattin cyclone of 30th November 1952.** *Current Science*, India, 22(4):98–102, April **1953.** 3 figs., 3 r **DWB**—A semipopular life history of a tropical cyclone, summarizing damages, weather repo from ships, discussing the barogram, which shows a pressure fall of about 40 mb with rapid fluct tions during the minimum, and analyzing the eye of the cyclone (diameter about 10 mi), the wi and air masses involved. During the last 62 years, 6 cyclones have struck the coast in this regi *Subject Headings:* **1. Tropical cyclones 2. Eye of typhoon 3. Cyclone, Nagapattinam, India (19 4. Nagapattinam, India.**—*A.A.*

7K–138 551.509.52:551.51

Masuda, Y.; Takeuchi, M. and Hashimoto, M., **On the forecasting of the movement of typho** *Papers in Meteorology and Geophysics*, Tokyo, 3(4):246–251, March **1953.** 4 figs., 8 refs. A in: *Journal of Meteorological Research*, Tokyo, 5(7):605–608, Aug. **1953. DWB**—From the res of streamline analyses of typhoons it is found that the point which corresponds to SCHERHA "delta" appears in the direction of the movement of a typhoon and approaches the typhoon ce with height. It is shown that the direction from the typhoon center to this delta point agrees w the direction of a steering current and that the typhoon moves along this direction. (*Same item* 6.1–93, Jan. 1955, *MAB.*) *Subject Headings:* **1. Typhoon tracks 2. Typhoon forecasting.**—*Auth abstract.*

7K–139 551.515.21:551.510.52/3

Nojima, H., **Typhoon "Ruth" observed at Tateno.** *Tateno, Japan. Aerological Observatory, nal,* 5(2):137–142, Jan. **1953.** 6 figs., 2 tables, 2 refs. In Japanese; English summary p. 137. —Structure of typhoon "Ruth" (Oct. 8–16, 1951) is shown in diagrams and cross sections. latter show temperatures and winds at every level to 30 mb and height of tropopause Oct. 14–16 ourly soundings) at Tateno, Japan. A table gives height, pressure, temperature and potential erature of tropopause during this period. Two levels of tropopause are given for each sounding they are called "double tropopauses" but some are only 400 to 600 m apart. During the prox- y of the typhoon the tropopause was high and cold. Vertical velocities and amount of pre- able water in the typhoon were calculated. (For additional data, *see* 4.2–124, Feb. 1953, *B.*) (*Same item as* 5D–228, April 1954, *MAB.*) *Subject Headings:* **1. Typhoon tropopause ropopause data 3. Typhoon "Ruth" (1951) 4. Vertical velocities 5. Precipitable water data ateno, Japan.**—*M.R.*

7K–140 551.515.2

Rodewald, Martin, **Die Höhenwind-Zirkulation um tropische Wirbelstürme.** [The upper d circulation around tropical cyclones.] *Zeitschrift für Meteorologie,* 7(11):337–343, Nov. **1953.** figs., refs. **DLC**—Study based essentially on radar wind data summarized by JORDAN (*see* -123). RODEWALD emphasizes that the asymmetric distribution of radial velocities is connected the migration of the cyclone. The pressure distribution at 45,000 ft height shows a well de- oped anticyclone to the right of a small cyclonic center. The thermal wind distribution, computed n the change of the wind vector from 7,000 to 45,000 ft, is strictly anticyclonic and indicates a m center. (*Same item as* 5.11–94, Nov. 1954, *MAB.*) *Subject Headings:* **1. Tropical cyclones yclone structure.**—*A.A.*

7K–141 551.515.2(679)

§Rodewald, Martin, **Der Weihnacht-Orkan 1950 im Kanal von Mozambique.** [Hurricane of ristmas 1950 in the Mozambique Channel.] *Seewart,* Hamburg, 14(3):1–9, June **1953.** 10 figs. **/B**—A very competent analysis of a hurricane, completely missed by the weather service due lack of observations. The unexpected entering of two ships in the hurricane could have been oided if the captains would have relied on their own judgment and exchanged weather information h other ships. The center of the hurricane could have been easily detected by observing the ection of swell from the two ships. (*Same item as* 5.3–157, March 1954, *MAB.*) *Subject Head- s:* **1. Hurricanes 2. Marine meteorological observations 3. Swell 4. Mozambique Channel.** *A.*

7K–142 551.515.21

Syōno, Sigekata (*Geophysical Inst., Tokyo Univ.*), **On the formation of tropical cyclones.** *Tellus,* :179–195, May **1953.** 5 figs., 7 tables, 5 refs., 118 eqs. **DLC**—A theoretical paper attempting obtain dynamically the criterion for the formation of tropical cyclones. The main factors in phogenesis are vertical thermal instability, horizontal dynamical stability and horizontal and tical dimensions of perturbations. A physical model of typhogenesis is given and a polytropic thod for treating latent instability is proposed. The perturbation equations for typhoon-type pical cyclones are derived by this method. The criterion for the development of perturbations typhoon-type is:

$$\frac{-gS}{Z^2} \gtrless 76n^2\mu_0^2 \begin{matrix}\text{develop}\\ \text{neutral}\end{matrix}$$

ere g, S, Z, n and μ_0 are gravity acceleration, vertical thermal instability, absolute vorticity, mber of loops in perturbations in vertical direction and number which gives horizontal dimension perturbation in 100 km, respectively. The left hand side has a form similar to Richardson's mber for the formation of turbulence. Also the modes of perturbation are studied. (*Same item* 5.3–163, March 1954, *MAB.*) *Subject Headings:* **1. Typhoon dynamics 2. Cyclogenesis 3. Ty- oon formation.**—*Based on author's abstract.*

1954

7K–143 551.515.21

Abdullah, Abdul J., **A proposed mechanism for the development of the eye of a hurricane.** *urnal of Meteorology,* 11(3):189–195, June **1954.** 5 figs., 11 refs., 24 eqs. **DWB**—The *incipient ge* consists of air converging to a sink below and diverging above, forming a simple vortex. The *mature phase* is the approach to a steady form with subcritical and supercritical rings and eye to which lower air cannot penetrate. *Mature phase* develops when unstable waves at upper rface of supercritical region develop into spiral hydraulic jumps with turbulent motion. This and iction cause loss of energy and flow into the eye, and a new equilibrium with a core of solid rotation.

Quasi-circular white bands on the radarscope are attributed to vibration at this stage. Whe supercritical region is annihilated the jumps disappear and *decay* sets in. These developmen set out mathematically with a numerical example. (*Same item as* 5.10–117, Oct. 1954, *M* *Subject Headings:* **1. Hurricane structure 2. Eye of hurricane.**—*C.E.P.B.*

7K–144 551.577:551.515.2

Berg, Hellmut (*Univ. of Köln*), **Gestalt und Veränderung der Niederschlagsgebiete N merikanischer Hurrikane.** [Form and change of precipitation areas of North American hurrica *Geofisica Pura e Applicata*, 28:273–284, **1954.** 6 figs., table, 14 refs. **MH-BH**—Maps of h precipitation were drawn for two hurricanes of North America. The development of precipit areas can be shown in the course of the development of the hurricane. The precipitation ar rather circular only in the beginning. It changes very quickly. The rain area ends suddenly i rear; moreover it is not large on the left side of the path. But there is extended precipitation a and on the right side. In the last stage the precipitation area leaves the center of the hurri A dynamical explanation is tried; influences of different air masses are rejected; influences o surface of the earth are supposed to be very small. Convergences which may lead to the form of clouds or to precipitation are formed on the one hand by deviation from geostrophic wind the deepening of the vortex and because of the falling of pressure in front of the hurricane, o other hand by convergences of flow in the area of entrance ("Einzugsgebiet"). Divergence formed in filling up and in the rising of pressure behind the moving center and in the delta o isobars. The changing of precipitation areas may be explained as the effect of a combinati these factors. (*Same item as* 6.8–284, Aug. 1955, *MAB.*) *Subject Headings:* **1. Hurricane ra 2. Precipitation areas 3. Convergence 4. North America.**—*Author's abstract.*

7K–145 551.515.23(7

§Dumont, M. (*Service Met. du Groupe Antilles-Guyane, Fort-de-France*), **Contribution á l'é de la prévision des cyclones dans la zone des Petites Antilles.** [Contribution to the stud hurricane forecasting in the area of the Lesser Antilles.] *Journal Scientifique de la Météorol* Paris, 6(22):59–68, April/June **1954.** 3 figs. **DWB**—This article begins with a description o general circulation in the northwest Atlantic and lists the meteorological signs pending the deve ment of a hurricane in the French Antilles. The frequency and trajectories of hurricanes are cussed; the latter are shown on maps. A detailed account of hurricane "Carol" of Sept. 1 including the synoptic situation, and of local meteorological conditions at Fort-de-France from S 1 to 5, 1953 are presented. The role of the equatorial current in the formation of hurrican mentioned. *Subject Headings:* **1. Hurricane formation 2. Hurricane "Carol" (1953) 3. Le Antilles.**—*I.L.D.*

7K–146 551.553:551.515.2(

Johnson, Russell E. (*Hydrologic Service Div., U. S. W. B., Wash., D. C.*), **Estimation of fric of surface winds in the August 1949 Florida hurricane.** *Monthly Weather Review*, 82(3):73 March **1954.** 8 figs., 3 refs. **DWB**—The equations of motion are adapted for use in comput the tangential and normal components of friction in a model hurricane. Values of the compon of friction are estimated from surface data of the Aug. 1949 Florida hurricane. The computat are based upon mean pressure and wind profiles describing the front and the rear portions of storm, within 28 to 70 mi from the center, as it moved through the Lake Okeechobee region. tangential component of friction appears to be greater than the normal component in the regio the rear of the center, while in advance of the center the opposite is generally observed. All fric curves show a continuous increase of friction with wind speed. (*Same item as* 6.1–213, Jan. 19 *MAB.*) *Subject Headings:* **1. Hurricane winds 2. Surface wind friction 3. Equations of mo 4. Florida.**—*Author's abstract.*

7K–147 551.515

Jordan, Charles L. and Jordan, Elizabeth S., **On the mean thermal structure of tropical cyclo** *Journal of Meteorology*, 11(6):440–448, Dec. **1954.** 15 figs., 5 tables, 11 refs. Also issued Chicago Univ. Dept. of Meteorology, Contract N6ori-02036, Project Nr 085 003, Reports Research (unnumbered), March **1954.** 13 p. 15 figs., 11 refs. Appended: Birchfield, G. E., S **reports on cloudiness as an aid in low latitude weather analysis.** 4 p. 2 figs., 4 refs. **DW** About 300 radiosonde ascents within 6° lat. of centers of mature hurricanes in West Indian a for period 1946–52 give mean temperatures at levels up to 50 mb, tropopause structure, surf pressure and heights of standard isobars. At 200 mb there is an anticyclonic ring around a cyclo core. Geostrophic components along and across direction of motion give a resultant to right track at low levels and to left at high levels. Tropopause is higher and colder towards cen Vertical circulation is shown schematically. The W. I. hurricane of Sept. 4–7, 1953, and the la Okinawa typhoon of Aug. 16–19, 1951, show features consistent with, though more marked than,

values. (*Same item as* 6.5–130, May 1955, *MAB.*) *Subject Headings:* **1. Hurricane structure phoon structure 3. Hurricane tropopause 4. West Indies. I. Riehl, Herbert.**—*C.E.P.B.*

7K–148 551.515.2(74/75)

Malkin, William and Holzworth, George C. (*WBAN Analysis Center, U. S. W. B., Wash., D. C.*), **Hurricane Edna, 1954.** *Monthly Weather Review,* 82(9):267–279, Sept. **1954.** 14 figs., les, 22 refs. **MH-BH**—The authors analyze some of the meteorological features associated the origin and movement of hurricane "Edna," the center of which reached New England on 21, 1954. A detailed account is given of the formation of "Edna," its track, of the various opmental stages of the air flow at the surface and at 500 mb and of the steering aspects. (*Same as* 6.7–182, July 1955, *MAB.*) *Subject Headings:* **1. Hurricane "Edna" (1954) 2. Hurricane mics 3. Atlantic Coast of United States.**—*I.L.D.*

7K–149 551.515.2:551.55(759)

Schloemer, Robert W., **Analysis and synthesis of hurricane wind patterns over Lake Okeechobee, da.** *U. S. Weather Bureau, Hydrometeorological Report,* No. 31, March **1954.** 49 p. numerous 3 tables. **DWB**—The climatological basis for synthesizing the design hurricane by analyzing characteristics of all significant hurricanes that reached any part of the U. S. during a 50-year d and the relationship of actual winds to theoretical winds, and the frictional dissipation of canes over land are investigated. This study presents a method for reconstructing the track the pressure and wind fields of a hurricane from sparse data, estimates the central pressures of ally all hurricanes that reached the U. S. during a 50-year period, gives a procedure for reducing ient winds to anemometer level winds at Lake Okeechobee, estimates the frequency of occurrence urricane winds at the coast, indicates that free air winds in a hurricane range along a storm is from subgradient speed at the periphery to supergradient speed at the radius of maximum , evaluates the average falling characteristics of hurricanes moving inland, confirms the existence n inverse relationship between hurricane intensity and lateral extent and presents the gust ors observed in hurricanes. The appendix includes a description of the method for approximating gradient wind speed. Maps show hurricane tracks for 1900–1949 and wind profiles for the ricane of Aug. 26–27, 1929. (*Same item as* 6.7–184, July 1955, *MAB.*) *Subject Headings:* **Hurricane analysis 2. Wind profiles 3. Hurricane winds 4. Lake Okeechobee, Florida. S. Corps of Engineers.**—*I.L.D.*

7K–150 551.515.21

Simpson, R. H. (*U. S. W. B.*), **Structure of an immature hurricane.** *American Meteorological ety, Bulletin,* 35(8):335–350, Oct. **1954.** 9 figs., 8 photos., 9 refs. **DWB**—The circulation in the of the Hurricane "Dolly," Sept. 10, 1953 was explored in order to determine whether a level ed at which a constant level balloon, released in the eye, would be translated with the storm and e as a marker on the movement of the center. Description of the flight including some of the m features, the general synoptic situation during the flight, the circulation features in the hurri-, the cloud structure (illustrated with photographs) and the thermal structure are discussed. noptic charts and dropsonde data are presented. (*Same item as* 6.8–213, Aug. 1955, *MAB.*) *ject Headings:* **1. Cyclone structure 2. Eye of hurricane 3. Hurricane "Dolly" (1953).**—*I.L.D.*

1955

7K–151 551.515.23

Arakawa, Hidetoshi, **Steering winds for a typhoon moving steadily northward and associated a well-marked warm sector in the free atmosphere.** *Royal Meteorological Society, Quarterly rnal,* 81(350):620–621, Oct. **1955.** 2 figs., ref. **DWB**—Time-altitude sections of upper winds temperatures at Kimpo airport near Seoul, Korea, on Sept. 12–16, 1954 (typhoon "June") w a well marked wind shift and warm sector. *Subject Headings:* **1. Typhoon structure 2. Ty-on "June" (1954) 3. Seoul, Korea.**—*C.E.P.B.*

7K–152 551.509.52:551.515.2

Deppermann, C. E. (*Manila Obs., Mirador, Baguio, Philippines*), **Tropical meteorological ors with special reference to typhoons.** (In: UNESCO Symposium on Typhoons, Tokyo, v. 9 12, 1954, **Proceedings,** p. 79–83, pub. **1955.**) **DWB**—The characteristics of atmospheric ssure, temperature, vapor pressure, winds and weather types in the tropics and the forecasting cedures for these elements are outlined. *Subject Headings:* **1. Weather forecasting 2. Typhoon ecasting.**—*I.L.D.*

7K–153 551.515.11:551.515.15

*Desai, B. N. and Rao, Y. P. (*both, Regional Met. Centre, Bombay*), **Some aspects of depressions l cyclones in the Indian seas.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12,

1954, **Proceedings,** p. 175–198, pub. **1955.**) **DWB**—The earlier studies on depressions and cy in the Indian seas were either based on sea-level data or from the point of view of air masses i systems from the available upper air data. RIEHL's work on the Pacific typhoons and At hurricanes has drawn attention to the role of troughs in the westerlies and upper troposp disturbances in the tropics itself on the formation of tropical storms. The upper air conditi the time of formation of nine depressions or cyclones in the Indian seas have been discussed present paper. In four cases depressions or storms formed under the regime of upper troposp northerlies in the eastern portion of a high. In two of these cases there is positive evide inphase superposition of a high in the westerlies on the high in the low latitudes. In four cases the formation seems to have taken place as a result of the interaction of the troughs in west with the tropical perturbations. In one case, however, available data did not show that cond at the time of formation were similar to the models put forward by RIEHL. In this case strengt of south winds and development of cyclonic shear preceded the formation of the depression. tension of the westerly belt into the area of the subtropical high seems to be a precursor to recurv of depressions and cyclones. Such extension is helped when a trough in the westerlies is aff Indian latitudes. The divergence in the forward portion of upper tropospheric troughs i westerlies also seems to influence recurvature of depressions, when they are sufficiently near. KATARAMAN noticed subsidence in the field of seven depressions or cyclones. The subsidi was coming from the inner storm area where it had ascended earlier. Two cases of marked subsi were at the cyclonic storm stage at distances between 130 and 260 mi from the center. I depression subsidence occurred within 30 mi of the center. With reference to the directi movement of the depression or cyclone, in only one case subsidence was in the rear; in the ot it was in the forward portion. (*Same item as* 6.11–208, Nov. 1955, *MAB.*) *Subject Head* **1. Cyclogenesis 2. Indian seas.**—*Authors' abstract.*

7K–154 551.515.23 (

Gentry, Robert C. (*U. S. W. B., Miami, Fla.*), **The 1954 hurricane season.** *Weather* 8(1):12–17, Feb. **1955.** 5 figs. **DWB**—All the hurricanes of 1954 are described briefly. paths are shown on a map. The pressure contours at 300 mb associated with the developme hurricane "Carol" and its path to Long Island and those for hurricane "Hazel" are reprod *Subject Headings:* **1. Hurricane tracks 2. Hurricanes 3. Hurricane "Carol" (1954) 4. Hurri "Hazel" (1954) 5. Atlantic Coast of United States.**—*I.L.D.*

7K–155 551.513.1:551.5

Haque, S. M. A. (*Dept. of Mathematics, Univ. of Dacca, East Pakistan*), **Relationship betw size and growth-rate of incipient convection disturbances.** (In: UNESCO Symposium on Typh Tokyo, Nov. 9–12, 1954, **Proceedings,** p. 207–211, pub. **1955.**) **DWB**—The growth of perturba in an annular region of vertically unstable air which is confined between two rigid horizontal pl and which encloses a central core of stable air inside and is enclosed on the outside by stable considered. The relationship between the size and growth-rate of such perturbations is establi and it is shown that under certain conditions, the perturbations will grow to the size of tro cyclones. (*Same item as* 7.1–198, Jan. 1956, *MAB.*) *Subject Headings:* **1. Cyclogenesis 2. phoons 3. Convective activity.**—*Author's abstract.*

7K–156 551.515.21 (512.

Heywood, G. S. P. (*Royal Obs., Hong Kong*), **Some notes on the structure of Hong Kon phoons.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, **Proceedings.** lished **1955.** p. 49–52. 3 refs.) **DLC**—A short spell of fine weather is almost always experie in Hong Kong when a typhoon is approaching from SE. It lasts until the center of the storm the average about 300 mi away, and it is attributed to divergence in the trade-wind stream w has overtaken the typhoon on its northern side. If the dew point in Hong Kong is several de below normal when a typhoon is approaching, the latter is likely to lose intensity as the dri enters its circulation. This sometimes happens in autumn when the NE monsoon has set in a the China Coast. Rainfall observations made during the passage of typhoons indicate tha heaviest precipitation occurs some distance outside the eye of the storm. This is confirme radar photographs, which show a ring of very heavy rainfall whose radius is greater than that o eye. Rainfall after the passage of the center tends to be heavier and more prolonged than d its approach. The tropical storm of Nov. 23, 1939, is described, as it showed several unusual feat It approached Hong Kong from WSW, presumably carried along by the upper westerly airst which prevails over S. China in winter. The great majority of typhoons affecting Hong occur earlier in the season and approach from SE. This was the only occasion on record in w the eye of a tropical cyclone passed over the observatory; observations made within the ey briefly described. A fresh surge of the NE monsoon reached Hong Kong just after the cente passed, and the storm became extra-tropical in type. (*Same item as* 7I–159, Sept. 1956, *M*

t Headings: **1. Typhoon structure 2. Typhoon, Hong Kong (1939) 3. Hong Kong.**—*Author's t.*

K–157 551.515.2:551.509.52

irasawa, K., **Forecasting of the movement of typhoon by using the steering current.** *Journal eorological Research*, Tokyo, 7(1):40–54, March **1955.** 3 tables, 17 figs., 12 refs. In Japanese; h summary p. 40. **DWB**—The author's attempt to determine the steering current which ls the movement of a typhoon with the aid of a model of the vertical structure of the typhoon, ticular the vertical distribution of upper currents, and to forecast the position of the typhoon. ams showing the principle for determining the steering current, wind structure of specific on and the behaviour of the steering current are presented and the procedure for forecasting ively the position of the typhoon is outlined. *Subject Headings:* **1. Hurricane movement sting 2. Steering current.**—*I.L.D.*

K–158 551.515.2

Iubert, Lester F. (*U. S. W. B., Wash., D. C.*), **Frictional filling of hurricanes.** *American rological Society, Bulletin*, 36(9):440–445, Nov. **1955.** 2 figs., table, 4 refs., eqs. **DWB, DLC** a hurricane moves from ocean to land, the surface roughness and the wind stress increase, n in turn causes the surface wind to blow across the isobars at an increased angle. The resulting ise in mass convergence in the surface friction layer is examined in the light of the Rossby- gomery theory on the influence of friction on surface flow, and the results are compared with nalysis of fifty years of hurricanes that moved into the United States. Those hurricanes are analyzed to study the rate of pressure gradient decrease in the maximum wind zone. The s of this study indicate that frictional effect alone cannot dissipate the dangerous winds of a re hurricane within the first eight to ten hours after moving onshore, but that dissipation is olled essentially by the energy budget. (*Same item as* 7.4–150, April, 1956, *MAB.*) *Subject ings:* **1. Hurricane dynamics 2. Frictional effects on hurricanes.**—*Author's abstract.*

7K–159 551.515.2

Kume, T. (*Central Met. Obs., Tokyo*), **Idealized fundamental model of the typhoon trajectories the latitude of recurving.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, eedings, p. 235–241, pub. **1955.**) **DWB**—For the extended forecast on the movement of oon, the idealized fundamental model of the typhoon trajectories and its seasonal modifications xplained. Especially the conservativeness of the sub-tropical high ridge over the upper chart inted out as the latitude of recurving. *Subject Headings:* **1. Typhoon trajectories 2. Recurva- of typhoons.**—*Author's abstract.*

7K–160 551.515.21

Namekawa, T. and Aoki, S. (*both, Dept. of Met., Kyoto Univ., Kyoto, and Nara Weather Station, t, Japan*), **On the structure of the disastrous typhoon hitting the Japanese Islands: a summary on Namekawa's theory of main and secondary typhoons.** (In: UNESCO Symposium on noons, Tokyo, Nov. 9–12, 1954, **Proceedings,** p. 55–59, pub. **1955.** 3 figs., eqs.) **DWB**—The ors present further theoretical evidence for the conclusion that a disastrous typhoon such as the oto typhoon, which appears on weather charts as one huge cyclonic pattern, actually consists rimary cyclonic pattern, called the "main typhoon" and secondary cyclonic patterns, termed the ondary" and the superposed pressure field of those two patterns has the appearance of a single onic pattern. (*Same item as* 7.2–140, Feb. 1956, *MAB.*) *Subject Headings:* **1. Typhoon structure pan.**—*I.L.D.*

7K–161 551.513.2:551.553.21:551.557

Ramanathan, K. R. (*Physical Res. Lab., Ahmedabad, India*), **On upper tropospheric easterlies the travel of monsoon and post-monsoon storms and depressions.** (In: UNESCO Symposium yphoons, Tokyo, Nov. 9–12, 1954, **Proceedings,** p. 243–244, pub. **1955.**) **DWB**—Aerological ies carried out from extensive networks of upper air stations particularly in North America Europe have shown that the cyclones of middle latitudes are intimately connected with the ulations of the planetary westerly circulation and enabled us to trace the connection between cyclonic vortices in the lower levels and wave-disturbances in the upper levels. But our in- ation regarding high level winds in the upper atmosphere over the tropics is yet too scanty. n the observations that are available from Southeast Asia, North America, the Pacific and ralia, it is now clear that there is an easterly planetary circulation over the tropics and that es form in this planetary stream. Indian meteorologists found in the high troposphere the erly jet stream with a speed of 90 kn in July and Aug. over India. Examples of tracks of cyclonic ms which crossed over from the China Seas across Indochina, Thailand and Burma from the

east and regenerated in the Bay of Bengal are numerous. During the monsoon months, occurs a succession of weather disturbances in the upper air moving one after another from t across south Asia, and these, when they combine with an inflow of moist air from south of the e develop into cyclonic storms of great extent but of feeble depth and contribute the major part rainfall of Burma, India, and Pakistan. It is most desirable to establish more radiosonde and wind stations in the tropics. (*Same item as* 7.2–135, Feb. 1956, *MAB.*) *Subject Headings:* **1. erly waves 2. General circulation 3. Aerological studies 4. Easterly jet stream 5. Cy storms 6. Monsoons 7. India.**—*Author's abstract.*

7K–162 551.511:551.

Sakuraba, S. (*Central Met. Obs., Tokyo*), **Some problems on the development of a ty** *Geophysical Magazine*, Tokyo, 26(4):257–265, Aug. **1955.** fig., 3 refs., 21+eqs. **DWB, D** The effect of moisture supply on development of hurricanes is discussed and computed as a fu of oceanic evaporation. It was found that the effect is less than the latent instability wh considered along with some other influencing factors. *Subject Headings:* **1. Typhoon develo 2. Instability effects on typhoons.**—*M.R.*

7K–163 551.515.21:551.5

Simpson, R. H. (*U. S. W. B., Wash., D. C.*) and Starrett, L. G. (*U. S. Air Force*), **F studies of hurricane structure by aircraft reconnaissance.** *American Meteorological Society, Bu* 36(9):459–468, Nov. **1955.** 12 figs. (incl. photos), 7 refs. **DWB, DLC**—Research data and p graphs obtained by aircraft reconnaissance in 1954 have clarified certain details of hurricane stru pertaining to the eye, the spiral rainbands, and circulation patterns. A mound of stratocu clouds frequently present in the eye seems to be associated with the storm's circulation c This "hub-cloud" in the presence of certain temperature distributions points to a level of divergence, usually below about 8000 ft MSL. Analysis of the rainband microstructure rev tendency for a pressure minimum immediately adjacent to and on the high pressure side spiral band. An explanation of this effect is proposed and the role it may play in the formati parasite circulations or false eyes is suggested. Finally, pictures taken from the airplane in the eye of the hurricane show cirrus clouds whose forms clearly establish the existence of a cy indraft at very high levels over the eye. (*Same item as* 7I–175, Sept. 1956, *MAB.*) *Subject ings:* **1. Hurricane structure 2. Eye of hurricane 3. Hurricane reconnaissance.**—*Authors' ab*

7K–164 551.515.21:551.50

Simpson, R. H. (*U. S. W. B., Wash., D. C.*), **On the structure of tropical cyclones as studi aircraft reconnaissance.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, **Proceed** p. 129–150, pub. **1955.** 19 figs., 10 photos.) **DWB**—In this comprehensive review, the a discusses the use of reconnaissance aircraft in the study of hurricane vortices of the simple hurr model. The thermal structure, the storm circulation, the cloud structure as indicated by r naissance data, the revised hurricane model on the basis of reconnaissance information, and th of the electronic beacon device to follow the movement of hurricanes are discussed. Photogra the eye of "Edna," diagram of hurricane circulation, of cloudiness, of synoptic analysis in the vi of specific hurricanes, etc. are presented. (*Same item as* 7.4–164, April 1956, *MAB.*) *S Headings:* **1. Hurricane structure 2. Hurricane models 3. Hurricane reconnaissance.**—*I.L.*

7K–165 551.

Syōno, W. (*Geophysical Inst., Tokyo Univ.*), **On the motion of a typhoon, Pt. 1.** *Meteorol Society of Japan, Tokyo, Journal, Ser. 2*, 33(6):245–261, Dec. **1955.** 6 figs., 10 refs., 127 eqs. **Pt. 2.** *Ibid.*, 34(2):111–114, May **1956.** 2 figs., 2 tables, 3 refs., 39 eqs. **DWB. Pt. 1** al *Collected Meteorological Papers*, Tokyo, 6(1/2), Dec. **1955,** Contribution No. 85. **Pt. 2,** in Contribution No. 88. **MH-BH**—In Pt. 1, the motion of a disturbance of typhoon-type is tr First, solving barotropic vorticity equation, the deformation of an initially circular disturba a changing basic flow with constant shear is treated. Second, the velocity components are by $U+\epsilon Y_0+\beta/CV$, where U and V are uniform basic flow, ϵ is constant shear of the basic Y_0 is the northward component of the coordinates of the center, β is the latitudinal variat Coriolis factor, C is a negative constant concerned with the scale of the disturbance. Third, tions of motion of the disturbance are obtained. Fifth, the calculated periods and amplitu meandering motion are compared with those of actual typhoons. Pt. 2 discusses some rem problems. First, the physical meaning of β-effect on a circular vortex is made clear. S integrating primitive equations of motion, the relation between pressure and velocity is obt Third, the balance equation by CHARNEY is obtained from the pressure function. Fourth, strophic pressure is estimated. *Subject Headings:* **1. Typhoon theory 2. Typhoon movem** *Author's abstract.*

1956

7K–166 551.509.52:551.515.2

Bath, A. T. (*Brisbane Weather Bureau*), **A study of 1954/55 season tropical cyclones and forecasting methods employed.** (In: Tropical Cyclone Conference, Brisbane, Queensland, Sept. 1955, Report. Melbourne, Bureau of Meteorology, [1956?]. p. 118–138. table, 5 refs. **Discussion,** (135–138.) **DWB**—While describing the 1954/55 season tropical cyclones affecting Queensland's weather, the methods of analysis employed to anticipate and follow the development of these cyclones are outlined. The material used to carry out this analysis is listed and suggestions are made for techniques to be employed during the 1955/56 summer season. *Subject Headings:* **1. Tropical cyclone forecasting 2. Tropical cyclones, Queensland (1954/55) 3. Queensland, Australia.**—*Author's abstract.*

7K–167 551.509.5:551.515.2:06

Bell, F., **Aeronautical aspects of tropical cyclones.** (In: Tropical Cyclone Conference, Brisbane, Queensland, Sept. 1955, **Report.** Melbourne, Bureau of Meteorology, [1956?]. p. 222–228. 3 refs.) **DWB**—This paper deals with the sundry channels into which Cyclone Warning Reports are directed by the Aviation Meteorological Offices on receipt of same from the Cyclone Warning Centre as required by ICAO procedures adopted by the Australian Bureau of Meteorology and the subject of several C.M.B. memoranda. In order to do this, reference is made to the types of reports received from all sources, the users of the meteorological information from an aeronautical point of view and the special requirements of these users. The systems and methods employed to ensure that these users receive the required information as quickly as possible are outlined as also the reverse process of passing observations from such users to the Warning Centre. Special mention is made of the aspect of pilot briefing by aviation meteorology duty officers in regard to flights in the Queensland Region. The conclusion summarizes the qualities necessary in the duty forecaster to successfully handle the situation during a cyclone period. *Subject Headings:* **1. Hurricane warning services 2. Queensland hurricane warning service.**—*Author's abstract.*

7K–168 551.515.22:551.576/7

Bond, H. G., **Cloud and rain in tropical cyclones.** (In: Tropical Cyclone Conference, Brisbane, Queensland, Sept. 1955, **Report.** Melbourne, Bureau of Meteorology, [1956?]. p. 64–77. 3 figs., 3 refs. **Discussion,** p. 75–77.) **DWB**—Cloud and rain distribution in tropical cyclones, from early birth through maturity to decay, is examined in some detail. Convective cloud tends to be disposed in parallel bands that spiral inwards as the cyclone intensifies. Some explanations of this cloud formation are advanced. Near the center of the deepening vortex an "eye" forms, within which is an area of relatively calm, clear weather. Over the whole cyclone area extends a vast deck of cirrostratus and altostratus cloud. The most violent activity of the storm is found in the walls of cumulo-nimbus surrounding the "eye." Graphic accounts of flights into the "eyes" of typhoons are quoted. An approaching tropical storm gives cloud sequences of warm frontal type, followed by rain squalls of increasing intensity. In the past decade radar has been invaluable in examining convective cloud and rain distribution in cyclones, and in determining their variation in time and space. *Subject Headings:* **1. Tropical cyclones 2. Typhoon rainfall 3. Eye of typhoon.**—*Author's abstract.*

7K–169 551.515.2(263.5)

§Colón, José A. (*U. S. W. B., San Juan, Puerto Rico*), **On the formation of hurricane Alice, 1955: some notes on other cold-season tropical storms.** *Monthly Weather Review*, Wash., D. C., 84(1):1–14, Jan. **1956.** 17 figs., table, 5 refs. **DWB, DLC**—Although it was claimed that hurricane "Alice" (Dec. 29, 1954–Jan. 4, 1955) was the first tropical hurricane to affect the Caribbean in the cold season, evidence is presented to show that similar cyclones have occurred (e.g., Jan. 1–10, 1951) before. Proof is also presented that "Alice" was a real nonfrontal or warm core cyclone embedded in the easterlies and with winds of hurricane proportions. Surface, 500 mb, time section (0–60 thousand feet) for Bermuda and San Juan, composite wind and streamline maps and comparative soundings (dropsonde in eye and radiosonde at San Juan, P. R.), and a sample map for storm of Jan. 1951, are reproduced and discussed in connection with the genesis, movement, structure and decay of "Alice." Damage amounted to a little over half a million dollars, mostly from rain and floods on Saba and Anguilla in the Antilles. The storm resulted from a favorable combination of elements—blocking in mid-Atlantic, a strong easterly flow, a cut-off or fractured trough over warm waters, etc. *Subject Headings:* **1. Hurricane "Alice" (1955) 2. Cold season hurricanes 3. Hurricane formation 4. Caribbean Sea.**—*M.R.*

7K–170 551.515.23

†Futi, H. (*Japan Meteorological Agency*), **On the oscillatory inertia motion of the atmosphere and the meandering movement of typhoon.** *Geophysical Magazine*, Tokyo, 27(1):105–168, Jan.

551.553.21

Colón, J. A. Theory of formation, deepening and filling of tropical cyclones. [Spanish] Boletín Informativo Servicio Meteorológico Nacional, Puerto Rico, Vol. 2, No. 1, 1950, pp. 1–9, figs. 1–6, refs. 1–10. Discussion, pp. 9–10. [1 ref.] D'A3— The object of the present paper is to examine the validity of the theories of the origin of tropical cyclones as presented and discussed by Bjerknes and Solberg in their well-known memoir of 1922. Certain assumptions made by these authors in their theoretical analysis are criticized and rejected. The author then develops a theory of tropical cyclones which is based on the principle of conservation of angular momentum. Certain results obtained from this theory are compared with observational data. The author concludes that the theory presented here may not be adequate to explain the formation of tropical cyclones, but that it may be useful in explaining the deepening and filling of tropical cyclones. — Author's abstract, modified.

551.553.21

Colón, J. A. The structure of tropical cyclones. In Tropical Meteorology Seminar, Proceedings, Vol. 1, 1956, pp. 1–10, 12 refs. Discussion, pp. 10–11. D'A3— This is a general summary of known facts about tropical cyclones. First the basic features of surface pressure and wind fields are described, and then the author discusses the energetics of the cyclone, with emphasis on the energy budget of the storm and the energy transformations which occur in it. Finally, the author discusses the theories of the origin of tropical cyclones, and concludes that the theory of Riehl and Haurwitz, which relates the formation of tropical cyclones to the existence of certain wind patterns in the upper troposphere, is probably the most satisfactory theory yet proposed. — Author's abstract, modified.

551.553.21

Colón, J. A. Theories of movement of tropical cyclones. In Tropical Meteorology Seminar, Proceedings, Vol. 1, 1956, pp. 1–11, 21 refs. Discussion, pp. 11–12. D'A3— The existing theories of the movement of tropical cyclones are discussed. The author concludes that the theory of Riehl and Haurwitz, which relates the movement of the storm to the existence of certain wind patterns in the upper troposphere, is probably the most satisfactory theory yet proposed. Some attention is made of the significance of the 200 mb mean isohypsic as a [illegible] — Author's abstract, modified.

551.553.21

Namias, J. On the recurving rainfall in the rear of a typhoon. Journal of Meteorology, Vol. 15, No. 2, pp. 158–165, March 1958. 4 figs. 4 refs. Paper. In [illegible] D'A3 D1C— Although it is well known that [illegible] its mechanism has not been made clear [illegible] a good number of meteorological observations were successfully [illegible] The author made an analysis of Typhoon 14, concerning the [illegible]

[illegible]

[illegible]

[illegible]

in the vicinity of typhoon "Tess" were made for the Wakasa District of Japan on the basis of r air data for Shionomisaki (Sept. 23–26, 1953), vorticity, vertical velocity, convergence and r computations, for two types of rainfall: 1) frontal rain and 2) "vortical" rain. Maximum ly precipitation as predicted is not in too close agreement with observed. It is suggested that r observations of heavy rain areas would be necessary because of the scarcity of upper air data se in prediction. *Subject Headings:* **1. Typhoon rainfall forecasting 2. Typhoon "Tess" (1953) akasa District, Japan.**—*M.R.*

7K–186 551.515.23(52)

Japan. Central Meteorological Observatory, Tokyo, **Report of the Typhoon Tess, Sept. 1953.** *Memoirs*, 39(2), **1955.** 181 p. numerous figs., tables, refs. **DWB**—The first 150 pages of this rt consist of 7 major sections, taking up (with much data, maps, charts, diagrams, etc.) various cts of typhoon "Tess" which struck the Tokai District of Japan on Sept. 25, 1953. The disance was first noted near Truk on Sept. 16. The first article takes up the general synoptic litions and movement every 3 hours from 16 Sept. to 29 Sept. The second article goes into the er air conditions during the formation; the third article analyzes the upper air situation during deepening phase and the passage over Japan; the fourth, the high tides; the fifth, the heavy rains floods; the 6th takes up areas of damage by wind, rain, flood and tide; and the 7th, the warnings ed and how they were transmitted to the affected towns and populations. In addition, there 3 articles by a number of authors on: 1) **Upper air observations of the Typhoon Tess, especially ne eye** (by MISHIMA, AYA, SATO et al.), 2) **Prediction of typhoon track by the zone of maximum d** (by T. OCHI) and **On the heavy precipitation at Wakasa District . . .** (by H. FUNADA). se are abstracted separately (*see* 7K–187, 7K–188, and 7K–185). *Subject Headings:* **1. Typhoon lysis 2. Typhoon "Tess" (1953) 3. Typhoon damage 4. Tokai District, Japan.**—*M.R.*

7K–187 551.515.23(52)

Mishima, T.; Aya, H.; Sato, I. et al., **Upper observations of the Typhoon Tess, especially in the , at Shionomisaki, Sept. 1953.** *Japan. Central Meteorological Observatory, Tokyo, Memoirs*, 2):155–163, **1955.** 11 figs., 2 refs. In Japanese; English summary p. 155. **DWB**—By means polar diagrams, adiabatic charts, hodographs, time cross sections to 80 mb level, isotach charts, ical velocity graph (for eye), and a model of the "eye" and the structure near the eye, the general logical features of "Tess" are analyzed and illustrated on the basis of data obtained at the onomisaki aerological station. The typhoon passed about 12 km NE of the station at 1444 h Sept. 25, 1953. The station was not in the eye but close enough to see light sky to the SE. The meter of the eye was 14–18 km. The rawinsonde (1424–1513 h) may have been in the eye from m to 9 km, as evidenced by decrease in humidity and increase in temperature compared with ier and later 6-hourly soundings. *Subject Headings:* **1. Typhoon analysis 2. Typhoon "Tess" 53) 3. Eye of typhoon 4. Upper air soundings in typhoon 5. Shionomisaki, Japan.**—*M.R.*

7K–188 551.509.312:551.515.23(52)

Ochi, T., **Prediction of typhoon track by the zone of maximum wind.** *Japan. Central Meteorocal Observatory, Tokyo, Memoirs*, 39(2):164–173, **1955.** 14 figs., tables. In Japanese; English mmary p. 164. **DWB**—An objective or graphical method of predicting the path of movement of hoon "Tess" (1953), applied also to "Ruth" (1951) and "Jane" (1950) is described and illustrated. e theory is that a typhoon moves along the polar front south of a blocking anticyclone to the th of Japan. Motion is toward the zone of maximum wind (jet stream). The northerly limit he typhoon track is at the boundary of the west and south component of the wind in the meri- nal cross section. It is also concluded that the convergence area in the lower layer of the latiinal cross section over Japan is related to the movement of the typhoon. *Subject Headings:* **Typhoon track forecasting 2. Objective forecasting of typhoon tracks 3. Typhoon "Tess" 53).**—*M.R. and author's abstract.*

7K–189 551.515.2

§Viaut, A., **La cyclone "Hazel."** [Hurricane "Hazel"]. *La Météorologie*, Paris, No. 38:99–111, ril/June **1955.** 17 figs. English and Spanish summaries p. 99. **DWB**—The development and vement of hurricane "Hazel" (Oct. 1954) is analyzed with the help of synoptic surface and 500 mb rts. The effect of a marked polar anticyclone on the hurricane's trajectory and its vertical velopment is discussed in particular. *Subject Headings:* **1. Hurricane "Hazel" (1954) 2. Hurrie analysis 3. Hurricane tracks.**—*G.T.*

7K–190 551.515.2:551.509.3

Hirasawa, K., **On the movement and weakening of the Typhoon June** (No. 5412), September 54. *Journal of Meteorological Research*, Tokyo, 8(4):205–208, June **1956.** 6 figs., table. 2 refs. Japanese; English summary p. 205. **DWB, DLC**—The movement and weakening of typhoon

June (Kyushu, Sept. 13, 1954) are discussed. A simple formula is suggested for computing c surface pressure development for a typhoon. Weak winds observed near the center over areas in Kyushu are shown to be due to the eye of the typhoon. The path predicted objectiv the basis of the steering principle are in agreement with the actual path of typhoon June. *Headings:* **1. Typhoon movement 2. Typhoon "June" (1954) 3. Kyushu, Japan.**—*A abstract.*

7K–191 551.509.3:551

Okamura, Y., **Barotropic forecasting of a typhoon by means of gradient flow pattern.** *J of Meteorological Research,* Tokyo, 8(6):335–342, July **1956.** 12 figs., 4 refs., 23 eqs. In Japa English summary p. 335. **DWB, DLC**—The geostrophic model available for conventional num forecasting is inapplicable to weather maps having complicated pressure patterns like in th of a typhoon. In order to improve this point it is considered to use the gradient flow patte numerical forecasting of typhoons. This method does not contain the procedure to separa parently the general field from the typhoon but contains the computation of the vorticity v gradient model in the typhoon area. In this paper the simplest barotropic model of the atmos is considered. As a result of using a gradient model the vorticity is a little smaller at the ty center and the field carrying vorticity is almost the same as in geostrophic cases. The metho provides a simple means for predicting the typhoon center. *Subject Headings:* **1. Numerical casting of typhoons 2. Barotropic models 3. Gradient flow patterns.**—*Author's abstract.*

7K–192 551.5

Otsuka, R., **On the diameter of the eye of typhoon.** *Journal of Meteorological Research,* T 8(4):239–240, June **1956.** 5 figs., 4 tables. In Japanese. **DWB, DLC**—Data for typhoons "L of 1954 and "Clara," "Kate," "Louise" and "Marge" of July and Sept. 1955 are plotted on g showing time distribution of wind speed and diameter of the eye of a typhoon during the 4 to 6 of each typhoon's passage. *Subject Heading:* **1. Eye of typhoon.**—*M.R.*

7K–193 551.509.3:551

Otsuka, R., **On the velocity of typhoons in autumn and their forecasting.** *Journal of M logical Research,* Tokyo, 8(4):181–188, June **1956.** 7 figs., 10 tables, 12 refs. In Japanese; E summary p. 181. **DWB, DLC**—The forecast velocities of several typhoons in autumn are disc and some investigations are made to find out a practical method of forecasting the velocity typhoon. It is concluded that the method of kinematic extrapolation, under the considerat 6-hourly velocity is effective as a practical method of 24-hour forecast during the period typhoon's acceleration. *Subject Heading:* **1. Forecasting typhoon movement.**—*From a abstract.*

7K–194 551.515.2

Swope, Paul H., **Caribbean Hurricane Seminar: new venture in technical assistance.** *Meteorological Organization, WMO Bulletin,* 5(2):42–45, April **1956.** 2 photos. **DWB.** Koteswaram, P., **Seminar on Hurricanes, Ciudad Trujillo, Feb. 1956.** *Indian Journal of Meteo and Geophysics,* 7(3):209–214, July **1956. DWB**—In the article by Swope, a photograph s 56 participants from 18 countries at the Seminar, Feb. 16–25, 1956, at the Univ. of Santo Dom Ciudad Trujillo, Dominican Republic. D. A. Davies, Secretary General of WMO welc participants and delivered an address on technical assistance. Forty lectures by 24 meteorol from 14 countries covered subjects of theory, networks, radar tracking, storm tides and f numerical forecasting, aircraft reconnaissance, construction, tropical analysis, warning system future research. Lecturers are listed. Article by Koteswaram gives a review of the ideas sented by the major participants (Dunn, Riehl, Grinsted, Palmén, Gherzi, Millas, et well as the general transactions. *Subject Headings:* **1. Hurricane seminars 2. Caribbean Hurr Seminar 3. Ciudad Trujillo, Dominican Republic.**—*M.R.*

7K–195 551.515.2:551.50

Takenaga, K.; Osada, E. and Yamaguchi, K., **On the analysis of typhoon June (No September 1954** *Journal of Meteorological Research,* Tokyo, 8(4):189–204, June **1956** 25 9 tables, 7 refs., 16 eqs. In Japanese; English summary p. 189. **DWB, DLC**—Typhoon "J took a path greatly different from the normal path for the season, *viz.* the path of summer Even in high latitudes it retained a form of central symmetry and had a small temperature gra in the typhoon region. Considering these features, the authors find that the various for hitherto postulated to express the distribution of pressure or wind velocity in a typhoon ar applicable to typhoon "June." A 700 mb prognostic chart is constructed by analyzing the p of upper air factors like westerly wind, jet stream and westerly trough. It is shown that to

oon forecasts more accurate it is necessary to take the typhoon structure into account. *Subject ings:* **1 Typhoon analysis 2 Typhoon "June" (1954).**—*Authors' abstract.*

7K–196 551.515.22:551.501.7

Watanabe, K., **The utility of dropsonde data observed in typhoon center.** *Journal of Me- ogical Research*, Tokyo, 7(12):765–769, Jan. **1956.** 6 figs., table, refs. In Japanese; English mary p. 765. **DWB, DLC**—Some examples are shown of using dropsonde data obtained in oon centers as an aid to typhoon forecasting. Diagrams are presented with the help of which minimum pressure at sea level can be estimated from the minimum height of constant level in a oon center and vice versa. When the thickness value of the 850~700 mb layer is larger than ft it can be concluded that the observation was made in the eye of a typhoon. *Subject Headings:* **yphoon forecasting 2. Dropsondes in typhoons.**—*Author's abstract.*

7K–197 551.515.2:551.509.3

Yagi, H.; Watanabe, K.; Terauchi, E. et al., **On the Typhoon Marie (No. 5415) on September** *Journal of Meteorological Research*, Tokyo, 8(4):209–216, June **1956** 12 figs. In Japanese; lish summary p. 209. **DWB, DLC**—Typhoon "Marie" was the worst in recent years. It Japan on Sept. 22, 1954 causing considerable damage in life and property. The typhoon was acterized by its quick movement up to 50 kn and the prevalence of strong southerly winds in the quadrant. This kind of a tropical disturbance which develops to the intensity of a tropical m or typhoon after it has recurved into a deep westerly trough should be treated as a developing tatropical cyclone. Several methods which were used to forecast this typhoon at forecast centers discussed and compared with the post-analysis. A simple method is suggested for forecasting movement of typhoons by means of the analysis and integration of the pressure waves of three- six-day periods. *Subject Headings:* **1. Typhoon development 2. Typhoon case histories yphoon "Marie" (1954) 4. Japan.**—*Authors' abstract.*

7K–198 551.515.2:551.509.3

Yamaguchi, K., **On the prediction of the typhoon intensity (Determination of the typhoon cture, Pt. 1).** *Journal of Meteorological Research*, Tokyo, 8(4):217–225, June **1956.** 4 figs., bles, 19 refs. In Japanese; English summary p. 217. **DWB, DLC**—It is shown that the structure typhoon can be defined and variations of its intensity and energy determined with the use of e elements, namely the vorticity in the central region, the radius of the eye and the outer radius he convection ring. *Subject Headings:* **1. Forecasting typhoon intensity 2. Typhoon structure.** *ased on author's abstract.*

PART III. REVIEWS OF RECENT IMPORTANT METEOROLOGICAL MATERIAL, AND METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The references to reviews of new books or monographs and the contents of periodicals included in this section are for information only and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of publication, the pagination may be omitted.

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATER

Academia Sinica: **Collected Scientific Papers, 1919–1949, Vol. 1, Meteorology.** Peking, 625 p. Review by B. Winid in *Przeglad Geofizyczny*, Warsaw, 1(1):87–88, 1956.

American Geophysical Union: **Antarctica in the International Geophysical Year, based on a posium on the Antarctic.** (Its) *Geophysical Monograph*, No. 1, 1956. 133 p. figs., tb bibliogs. Price, $6.00. Review in *American Meteorological Society, Bulletin*, 37(8):438 Oct. 1956.

Beelitz, Paul: **Radiosonden** [Radiosondes]. Berlin, Verlag Technik, 1954. 136 p. 19 t 56 figs., 85 refs. Review by T. Kopcewicz in *Przeglad Geofizyczny*, Warsaw, 1(2):137–138,

Evans, Edward R. G. R. (Admiral Lord Montevans): **The Antarctic challenged.** New Yor Graff, 1956. 247 p. illus. Price, $4.50. Review by Laurence M. Gould in *Scientific Mo* Wash., D. C., 83(4):210–211, Oct. 1956.

Fleagle, R. G.: **The temperature distribution near a cold surface.** (In) *Journal of Meteo* 13(2):160–165, April 1956. Review by F. I. Badgley in *Applied Mechanics Reviews*, 9(9):408, Sept. 1956.

Gaussen, Henri and Barruel, Paul: **Montagnes: la vie aux hautes altitudes** [Mountains: high altitudes]. Paris, Horizons de France, 1955. 207 p. maps, diagrs., illus., bibl Price, 2950 Fr. Review by Joseph Gentilli in *Geographical Review*, N. Y., 46(4):59 Oct. 1956.

Georgi, J.: **Kleines Absolut-Pyrheliometer** [Small absolute pyrheliometer]. *Germany. Deu Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Veroffentlichung*, N 1954. 82 p. 15 figs., 2 tables, bibliog. Review by F. Liana in *Przeglad Geofizyczny*, W 1(2):138, 1956. (*See* 6.10–77, Oct. 1955, *MAB.*)

Greathouse, G. A. and Wessel, C. J. (eds.): **Deterioration of materials.** N. Y., Reinhold, 835 p. numerous figs. Price, 96sh. Review by R. E. Lacy in *Weather*, London, 11(10 Oct. 1956.

Handbuch der Physik, Vol. 47, Geophysics, ed. by I. S. Flügge. J. Bartels, group editor. H Springer-Verlag, 1956. 659 p. Price, DM. 118. Review by B. Gutenberg in *Science*, W D. C., 124(3226):826, Oct. 26, 1956.

Hoyt, William G. and Langbein, Walter B.: **Floods.** Princeton, Princeton Univ. Press, 1955. illus. Price, $7.50. Review by A. N. Sayre in *Science*, Wash., D. C., 124(3222):591, Sep 1956. (*See* 7.7–4, July 1956, *MAB.*)

Khromov, S. P. and Mamontova, L. I.: **Meteorologicheskii slovar'** [Meteorological glos Leningrad, Gidromet. Izdat-vo, 1955. 454 p. numerous figs. Review by A. Roje *Przeglad Geofizyczny*, Warsaw, 1(2):138–140, 1956. (*See* 7.8–10, Aug. 1956, *MAB.*)

Konrad, Albes: **Einfluss des Waldes auf Klima und Niederschlag** [Influence of forest on cl and rainfall]. *Wasserwirtschaft und Wassertechnik*, Berlin, No. 8, 1952. Review by J. La in *Przeglad Geofizyczny*, Warsaw, 1(1):92–94, 1956.

Krypton, Constantine: **Northern sea route and the economy of the Soviet North.** N. Y., for the Research Program on the U.S.S.R. by Frederick A. Praeger, 1956. 219 p. Price, $5.00. Review by Svenn Orvig in *Geographical Review*, N. Y., 46(4):589–590, Oct.

Lake, H.: **A meteorological analysis of clear air turbulence, (a report on the U. S. synoptic altitude gust program).** *U. S. Air Force. Cambridge Research Center. Geophysical Re*

Papers, No. 47, Feb. 1956. 63 p. Review by H. Arakawa in *Applied Mechanics Reviews*, N. Y., 9(9):408–409, Sept. 1956.

b, H. H.: **Meteorological Results of the Balaena Expedition, 1946/1947.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 94, 1956. 68 p. Price, 8 sh 6 d. Review in *Nature*, London, 178(4531):461, Sept. 1, 1956. (*See* 7.10–4, Oct. 1956, *MAB.*)

ıge, P.: **Diffusion processes in the thermosphere.** (In) *Annales de Geophysique*, 11(2):153–168, 1955. Review by R. O. Reid in *Applied Mechanics Reviews*, N. Y., 9(9):408, Sept. 1956.

gatroyd, R. J.: **High cloud over Southern England.** *Great Britain. Meteorological Office, Professional Note*, No. 119, 1956. 20 p. Price, 9 d. Review in *Nature*, London, 178(4537):788, Oct. 13, 1956. (*See* 7.9–199, Sept. 1956, *MAB.*)

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